THE IRON AGE

THURSDAY, SEPTEMBER 4, 1902.

A 2240-Pound Ton of Pig Iron.

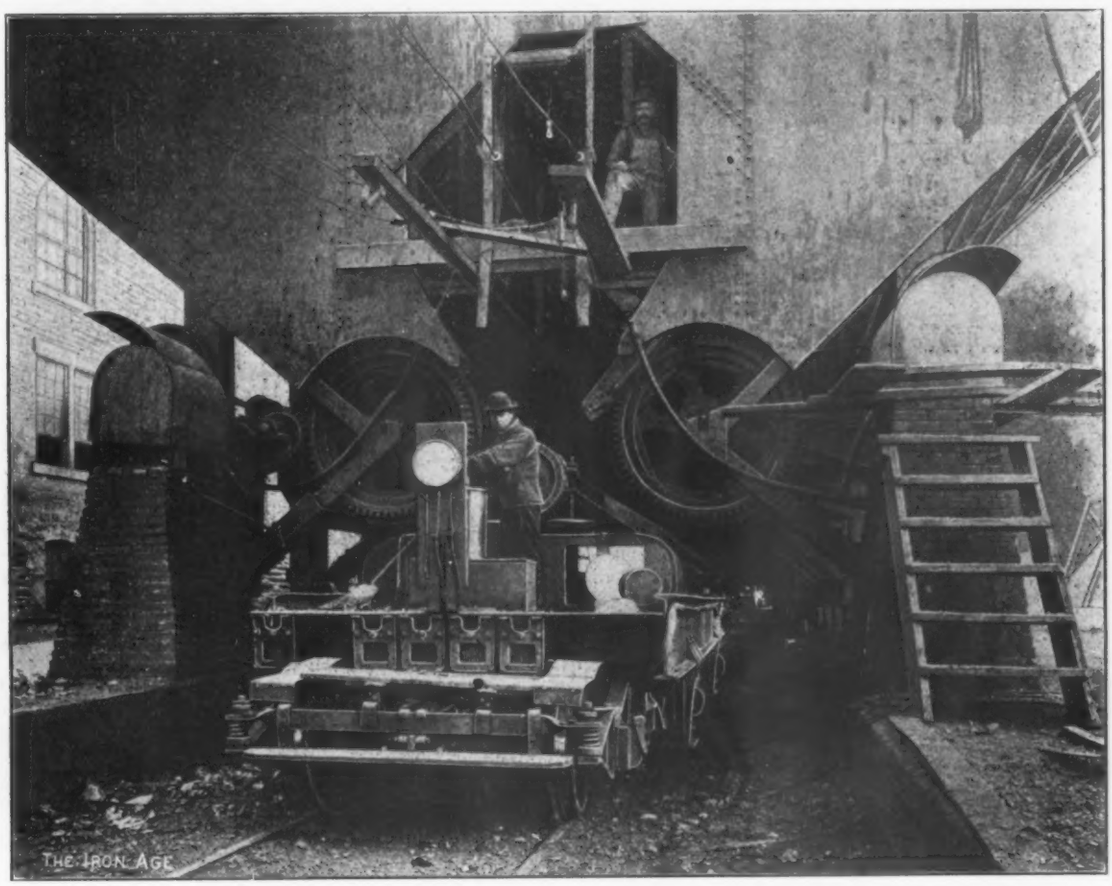
Some months since a movement was started by some of the Southern blast furnace owners to adopt a uniform ton of pig iron of 2240 pounds, this to include Bessemer, foundry and forge iron. It is claimed, and with good reason, that the present practice of selling basic and chilled metal in tons of 2240 pounds and the other grades of sand iron at 2268 pounds leads to more or less confusion in the trade, and should be eliminated if possible. In order to secure a uniform ton of 2240 pounds letters were sent out by a leading Southern furnace interest to Northern blast furnace operators, asking their co-operation in securing a uniform ton of 2240 pounds of pig iron to apply on all grades. The result of this movement has been that a number of the furnaces in the Mahoning, Shenango and Hocking valleys and elsewhere have already adopted the 2240-pound ton, and others will likely do so in a short time. The furnacemen whose stacks run on foundry iron point out the fact that much of their output has to be broken for their foundry trade, and in doing this the greater part of the sand and scale is removed and the buyer gets clean iron. For this reason many of the furnaces are already billing foundry iron at 2240 pounds to the ton and others will soon do the same. The furnace operators who run on Bessemer and forge, while lacking the arguments used by the foundry iron makers, are almost a unit in favor of the 2240-pound ton and will adopt it just as soon as certain contracts have been filled with buyers who insist on the 2268 pounds. It would seem to be to the best interests of the maker of iron, as well as the buyer, to have a uniform ton and the indications are that it will only be a short time until it is adopted.

The Hoover & Mason Ore Handling System.

Full Description of the Installation at South Chicago.

One of the most interesting as well as one of the most important of the modern economic devices adopted by the Illinois Steel Company at their South Chicago works is the ore handling system, designed and erected by Hoover & Mason, Old Colony Building, Chicago. This system is unique in many respects, presenting almost revolutionary features in the methods employed. The ingenuity displayed in accomplishing results heretofore deemed impracticable to be undertaken by mechanical appliances has elicited the unstinted commendation of the most experienced engineers. This ore handling system is the most comprehensive thus far installed, including as it does every operation in handling ore at a furnace plant, from the unloading of vessels by machinery to the filling of the furnace stacks.

The practical utility—the saving of time, labor and money—of the new system and ore handling devices has been fully demonstrated to the satisfaction of the Illinois



Scale Car and Ore Pockets.

THE HOOVER & MASON ORE HANDLING SYSTEM.

Steel Company and to the gratification of the designing engineers. When first adapted to the needs of one furnace the invention was regarded as somewhat of an experiment in the way of ore handling, but the fact that the system has been extended to another furnace, each furnace having a daily capacity of 500 tons, is proof that it is a success.

This ore handling plant is operated in connection with the two new large furnaces, Nos. 9 and 10, which were completed last year and are located at the north end of the Illinois Steel Company's property at South Chicago. These furnaces are a considerable distance from the company's other blast furnaces and have their own ore docks and storage yards on the shore of Lake Michigan. Ore is, however, also shipped from these docks and yards to other of the company's furnaces. The installation of the ore handling system is particularly interesting at this time in view of the tendency lately to establish blast furnaces in proximity to water transportation on the lakes. In this plant the idea has been kept in view of taking every advantage of such a situation; that is, as much as possible to bring into intimacy the cargo of ore in the vessel and its destination in the furnace. The plant is boldly new in many respects, as will be seen from the description which follows. The general plan and general cross section shown in Fig. 2 clearly brings out the salient features of the ore handling scheme, which consists of, 1, a battery of ore unloading machines placed on the dock, 15 in number; 2, large ore bridges spanning and controlling the entire space from the dock front to the furnace pockets; 3, the furnace pockets, and, 4, the scale car, which collects, weighs and delivers the ore to the furnace skip. The cross section also shows the extent of the ground covered by this system, which is over 567 feet in length from dock to furnace.

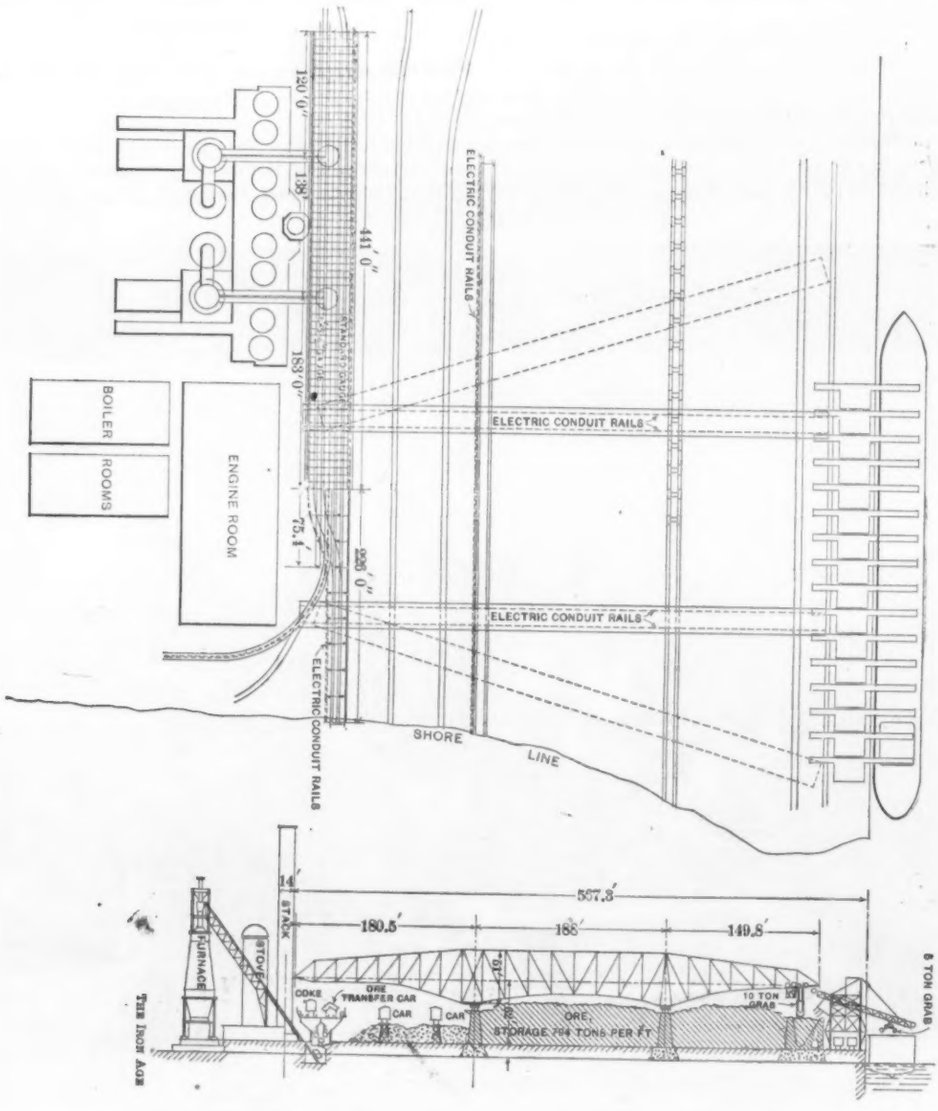


Fig. 2.—General Plan and General Cross Section.

The Vessel Unloaders.

The Hoover & Mason vessel unloaders have now been in use for the past three seasons. Their general appearance is well brought out in the photographic reproductions, Figs. 3, 4, 5, 6 and 8. They rest on tracks

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upon the dock, are self moving and in every respect are controlled by a single operator. The grab or excavator of each unloading machine has an average capacity of 5 tons, occasionally taking loads up to 6½ tons. Speed of a trip a minute is maintained. The large lake boats in the ore service which discharge at the docks of the Illinois Steel Company carry about 7000 tons at each trip, about 500 tons being accessible for unloading at each hatchway. With the excavator no difficulty is experienced in getting out within the first hour one-half the ore near a single hatchway. In this manner by a single operator all that portion of the cargo which is either under the hatch or in a condition to cave or run to the hatch is taken out and delivered either to railroad cars under the machines or into the trough in their rear. The second half of the cargo

must be manipulated in order to bring it under the hatch and therefore available to the grab or excavator. This work is accomplished by an ingenious scraper system.

The vessel unloaders are operated by steam taken from the furnace boilers, brought in a conduit some 600 feet and delivered along the dock front through a 6-foot tunnel, which shows in the general section, Fig. 2, and in the engraving, Fig. 4, each unloader being connected to this main steam line by flexible connections.

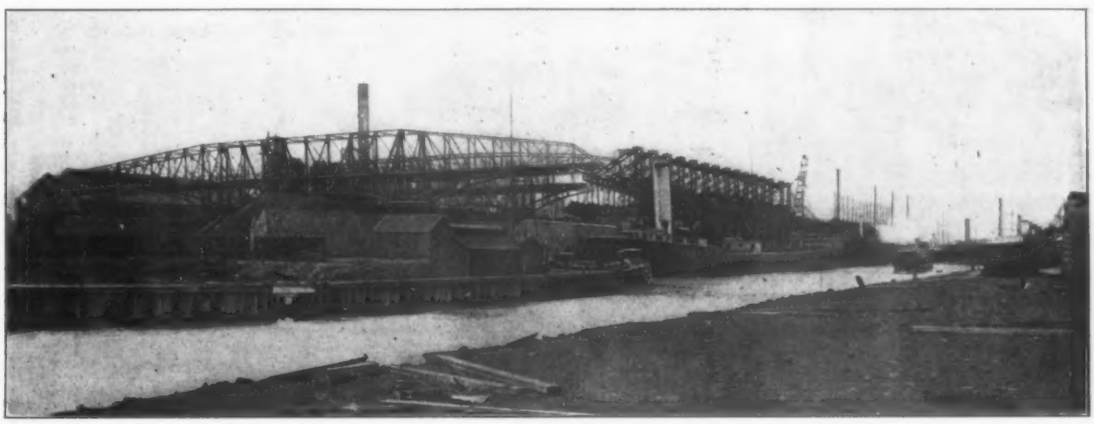

Fig. 3.—General Arrangement of Vessel Unloaders and Ore Bridges.

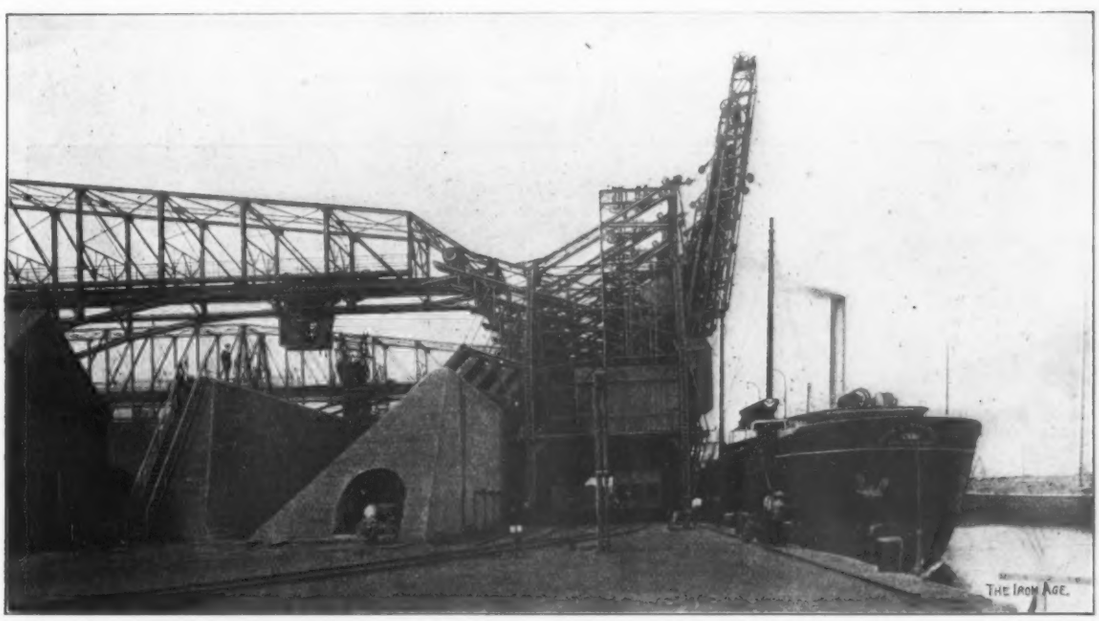

Fig. 4.—End View of Unloaders, Concrete Trough, Tunnel for Steam Pipes, &c.

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This tunnel not only enables the pipes to be readily accessible, but also affords a safe passageway free from the danger of crossing the tracks.

Manipulating the Cargo.

A reference to the diagram, Fig. 9, shows the condition of the cargo after the first half has been taken out by the grab. The residue lies in piles between the hatchways. A longitudinal section of the vessel gives an idea of its form. The scraper itself resembles a gigantic hoe weighing a ton, the details being shown in Figs. 10 and 11. An engine, arranged for the purpose, situated ashore upon the unloading machine, operates this scraper. A workman controls the engine by means of cords from his position down in the vessel itself, where he can clearly observe the work of the scraper. This operator holds two cords, one in each hand. The engine is so arranged that by pulling one or the other of these cords the scraper moves back and forth. There is no difficulty in making six strokes back and forth in a minute, each reciprocation taking about 1600 pounds of ore. The plan diagram in Fig. 11 shows the way in which this residue is scraped into a position beneath the hatch. The procedure is to make about five scrapes, which yields a grab load, and it is then taken away by the operator in a similar manner to the first half of the cargo. The best work so far acomplished was the taking out of an entire hatch containing 540 tons in four hours and one minute at a total cost of $2.

The Trough.

Referring to Fig. 4, the concrete trough shown in the rear of the unloader is used whenever the ore is not to be shipped in cars. It is therefore brought into use for about one-half the work of the unloaders, or such ore as is required for the annual supply of furnaces Nos. 9 and 10, which is about 750,000 tons. This ore is unloaded from the vessel into the trough, from which it is taken by grabs operated from the ore bridges. The bottom of the trough is rounded to facilitate the operation of these grabs.

The Ore Bridges.

The ore bridges commanding the ore stock and reserve stock of coke and limestone are 520 feet long and rest upon concrete walls, which also serve to separate the ores. There are two of these bridges, and they are decidedly novel in respect to their support. They are not only susceptible to movement along the walls in a posi-

tion at right angles to the axis of the walls, but may be moved to a position varying therefrom to about 30 degrees. That is, one end of the truss may be kept in the same place and the other end moved 300 feet, a feature which is of considerable value when the exigencies of the ore stock, due to carrying a number of varieties of ore in the piles, are borne in mind. The operating device upon this bridge is simply that of a great street car, which carries the necessary mechanism to operate the grab. The whole bridge is operated electrically. For the purpose of operating the grab two 125 horsepower Westinghouse railway motors are provided, and for the purpose of transverse movement two 35 horsepower Westinghouse railway motors are utilized. This trolley has Westinghouse air brakes, the traversing motors may also be used as brakes, and there is in addition a hand brake. The grab has a capacity up to 13 tons, its transverse speed runs to 1000 feet a minute, and the hoisting speed is about 100 feet a minute. The bucket itself weighs about 11 tons, and the whole trolley when loaded something over 100,000 pounds. The operator travels with the load at all times, having full control of the grab and being thus enabled to load or unload at any point with exactness day or night and in all kinds of weather. These bridges are utilized to distribute the ore from the trough to the storage yard or from either of these reservoirs to the ore pockets or to cars on the trestles. By reference to the general cross section, Fig. 2, it will be seen that cars can be loaded on two different tracks to be transferred to other parts of the works. When it is realized that each bridge occasionally handles, when working near the trough, 1000 tons in an hour, it

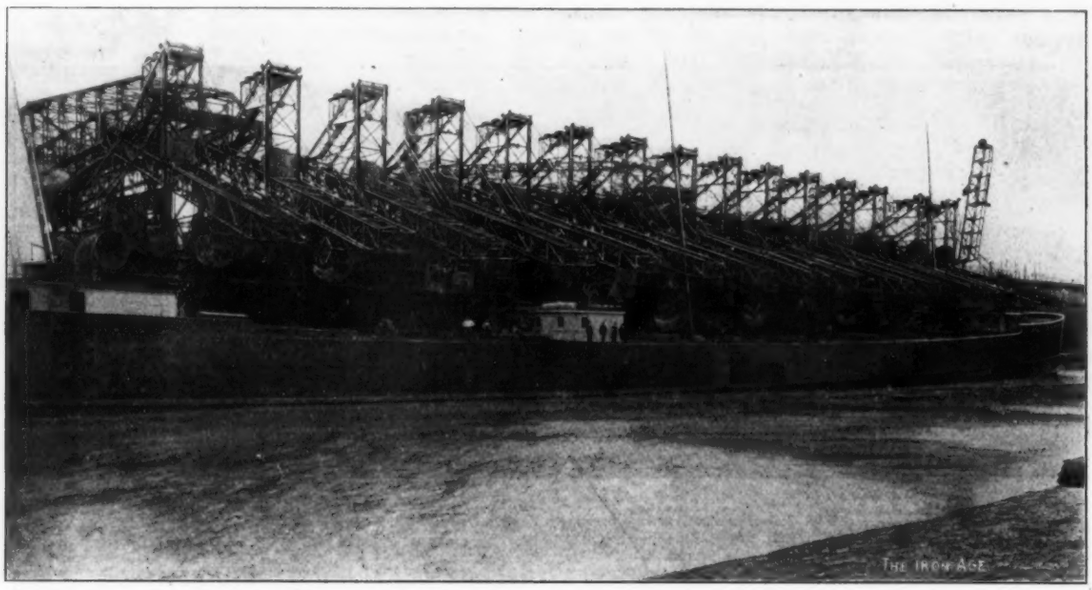

Fig. 5.—Unloaders in Position for Work on a Vessel.

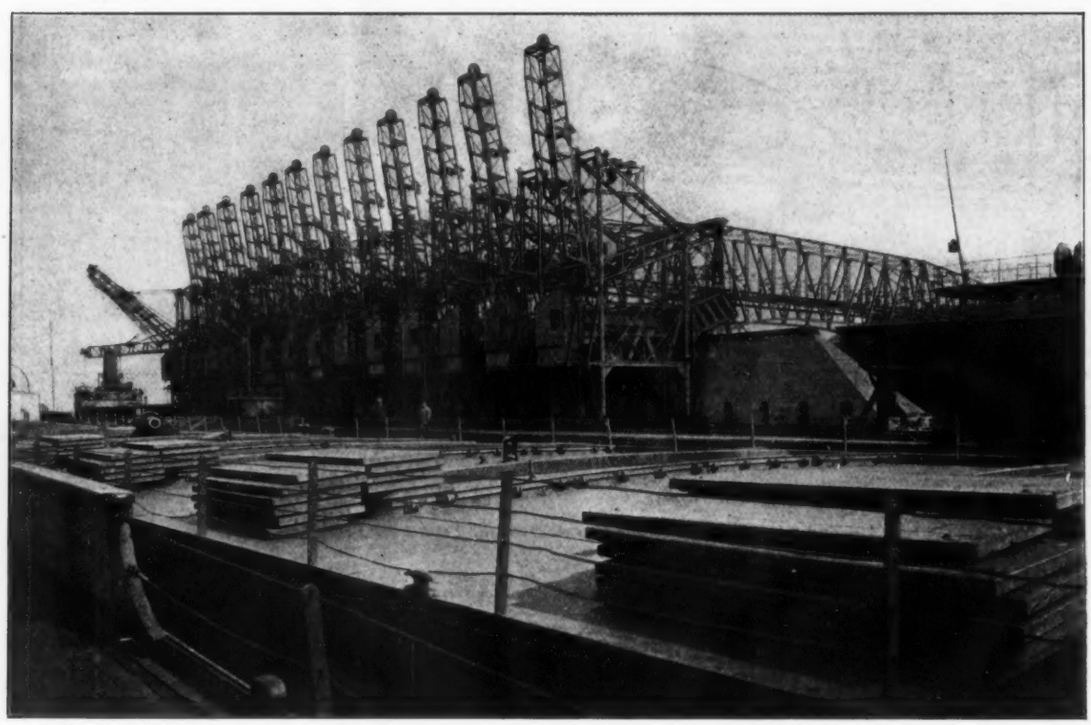

Fig. 6.—Unloaders Partly Elevated to Clear the Vessel.

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will be realized that very serious problems have had to be met and overcome in its details.

Protection Against Accidents.

The whole bridge is controlled by a single operator, but it is thought best not to leave so potent a machine

Fig. 7.—The Grab Opened to Take a Load.

for good or ill to one man. The operator is therefore provided with an understudy who does the occasional oiling, much in the fashion that a fireman is provided on a locomotive—as a sort of insurance against sudden incapacity on the part of the operator. To provide against a runaway on the bridge and its serious consequences a buffer is made out of a number of Westinghouse friction draw heads, which are placed tandem, so that the trolley may strike the end with some velocity without harm.

Transfer Cars.

Unfortunately, the axis of the stock pile could not be placed symmetrically with the furnaces, so that, in spite of the ability of the truss to be placed obliquely across the yard, a transfer car is necessary over the pockets. This transfer car is operated electrically with street car devices, and is of very large capacity, so that nicety is unnecessary on the part of the bridge operator to deliver his great load to the transfer car without spilling or slopping over.

The Ore Pockets.

The ore pockets are located near the furnace stacks, as shown on the general cross section, Fig. 2. Each

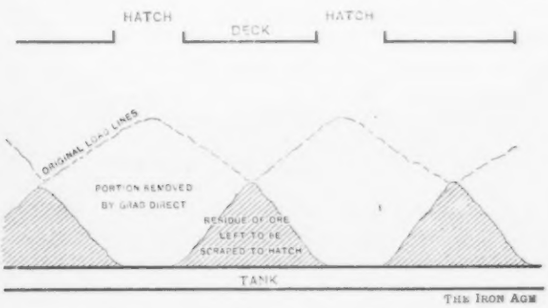

Fig. 9.—Longitudinal Section of Ore Vessel.

has a capacity of 70 tons. They are of the Hoover & Mason roller type, a view of which is shown in Fig. 1 and in cross section in Fig. 15. The essential features of these pockets are, 1, the success with which the design eliminates the disposition of the ore to choke over the outlet, and, 2, the speed and accuracy with which the ore may be withdrawn and delivered to the scale car. The bottom or outlet of the pockets is guarded by a revolving cylinder or roller. When the roller is at rest the ore is held securely in the pocket; when it revolves the ore is discharged through the outlet into the scale car beneath. The pockets have vertical sides, and the outlet is the full size of the pocket body, so that there is no disposition to arch in a direction along the axis of the battery. The disposition of the ore in the pocket to arch in the other direction is removed by a system of louvers. These louvers while accomplishing this also afford ac-

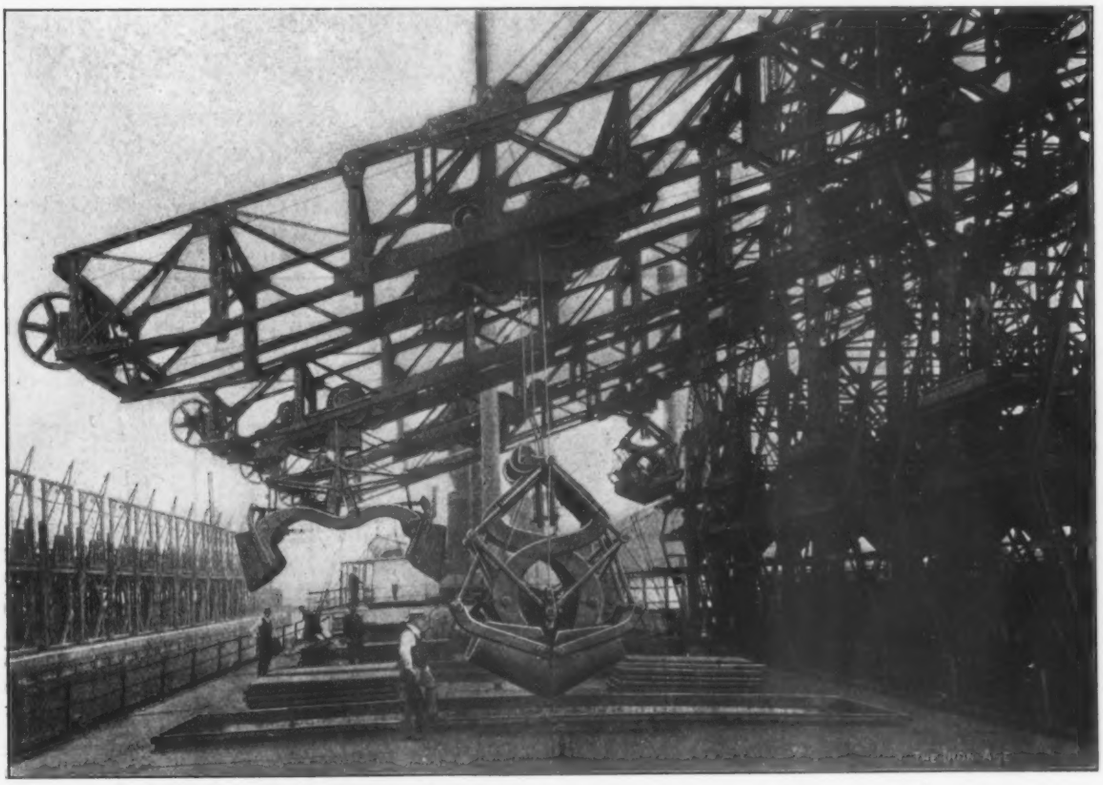

Fig. 8.—View of Unloaders and Grabs from the deck of a Vessel.

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cess in the case of certain very sticky ores, so that any material may be successfully manipulated in these pockets. They are readily accessible to an operative who is free from danger on a bridge erected in the space underneath and between the pockets. The rollers themselves are operated by continuous motor driven shafts, which at the will of the operator can be thrown into occasional contact by means of a cord attached to a lever in an eccentric box. To prevent freezing, the pockets are heated by passing hot air through a chamber on the outside and also through the divisions between them. It will be seen from the diagram that the pockets are double, the right hand series being reserved for ore, the left hand series for coke and stone. By this plan the scale car, over a single track, can obtain all the needed ingredients to charge the furnaces. The rollers on the

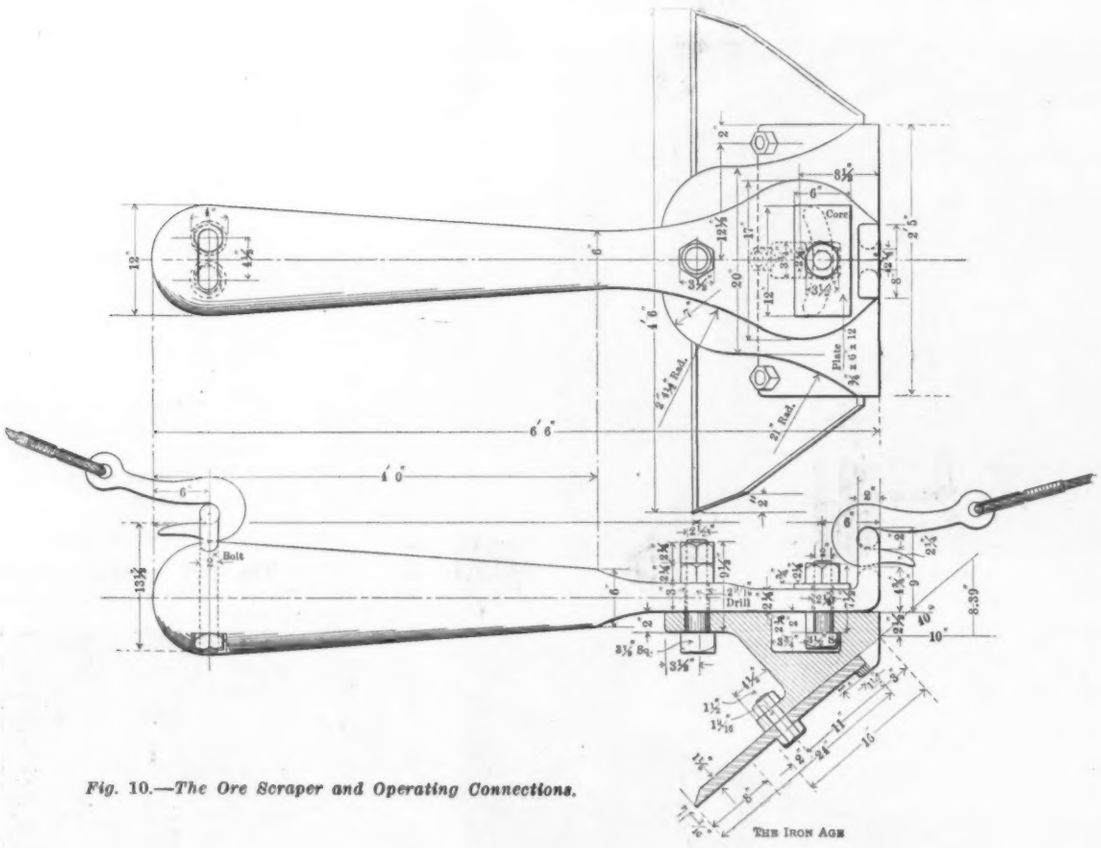

Fig. 10.—The Ore Scraper and Operating Connections.

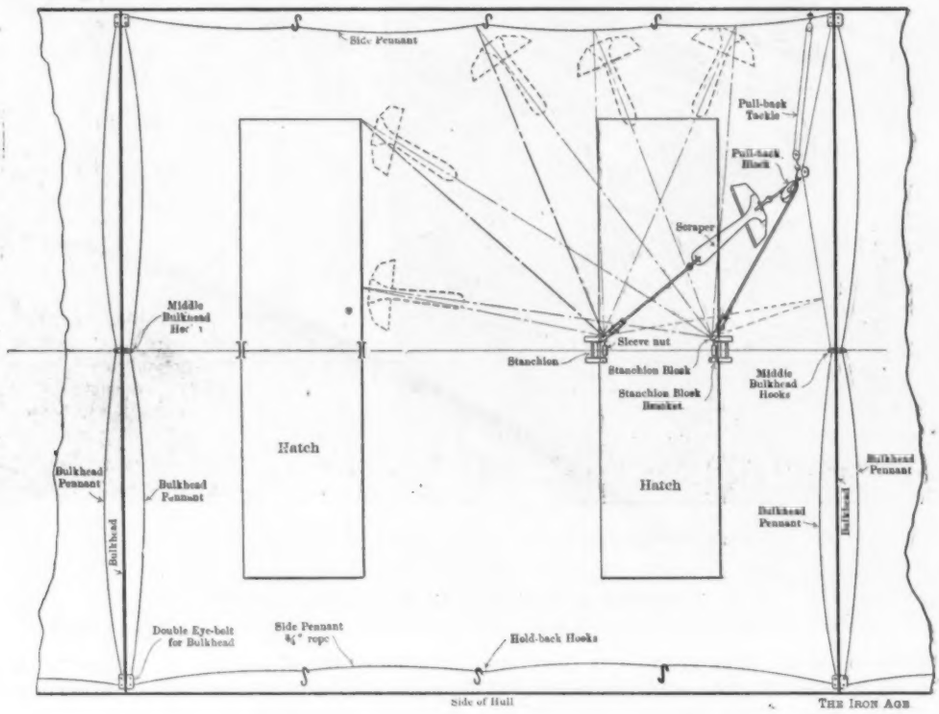

Fig. 11.—Plan Showing Operation of Scraper in Boat.

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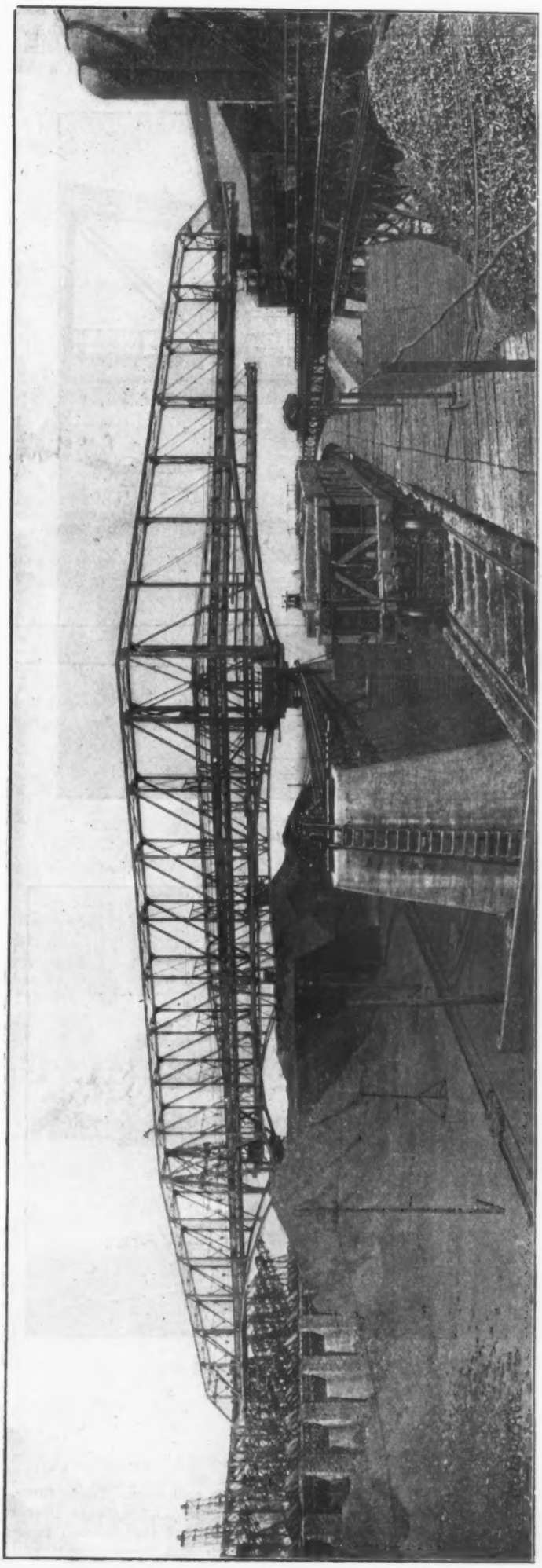

Fig. 12.—View of Ore Bridges, Extending Over Storage Yards, from Unloaders at Dock to Pockets at Furnaces.

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coke and limestone side are perforated, affording a most thorough screening and separation of the dust, which is, of course, not put into the furnace. The mouth of the ore pockets is protected by a grille or screen, the meshes of which are 18 inches. This device is necessary to intercept large lumps of ore, for it must be borne in mind that since this ore is handled entirely mechanically from the mine to the furnace there is not that safeguard which commonly obtains in the strength of a man to lift an individual lump. Such lumps as are intercepted by this grille on the ore pockets are isolated and easily broken to a size proper to be received in the furnace by sledges or in any convenient manner.

The Scale Car.

The scale car is shown in Fig. 16. It receives two skip charges at one trip, and has a capacity to receive and weigh 40,000 pounds of ore. Two of these cars are provided, one for each furnace. They run on tracks directly underneath the pockets and after receiving a charge deliver it to the furnace skip, discharging the load through the bottom of the car to the skip below. It is important to note that the service of only one man is required to collect, weigh and charge each furnace with ore, coke and limestone. One operator has had no difficulty in keeping each furnace going for the past six months in all kinds of weather and with all conditions of ore. This car is novel in almost all respects. It is operated electrically. Its most distinguishing feature, perhaps, is the device for automatically recording the operations of the car, by means of which a printed record is made of every act of the operator, furnishing the furnace superintendent with an unimpeachable record of what has been delivered to his furnace. The illustration in Fig. 16 shows the dial and operating device. The balance on the scale beam is not manually manipulated at all, the work being done by a spring, which indicates with an arrow on the dial the load upon the car. Various colored buttons placed upon this dial indicate to the operator the amounts of ore which he has to draw to make up a round. The weights are printed on a stock ticker ribbon. A scrutiny of these ribbons shows that an accuracy within three-tenths of 1 per cent. is obtained. Probably this is the first occasion when a furnace manager has been in position to absolutely know what has been put into his furnace day by day for an extended period.

Great Economies Secured.

Under the old method of handling iron ore at South Chicago, from the boats at the docks to the charge at the furnace, over 300 men were employed for two furnaces, but the completion of the Hoover & Mason system permits the same amount of work to be done by 26, with little noise, no confusion and at a minimum cost. Indeed, the saving in the handling of ore at South Chicago largely compensates for the relatively high cost of fuel as compared with the cost at the Pittsburgh plants of the United States Steel Corporation, demonstrating some of the advantages Chicago possesses as a center for the manufacture of iron and steel. These facts, in conjunction with the recognized advantages that city possesses for the distribution of the finished product, make certain the extension and improvement of the

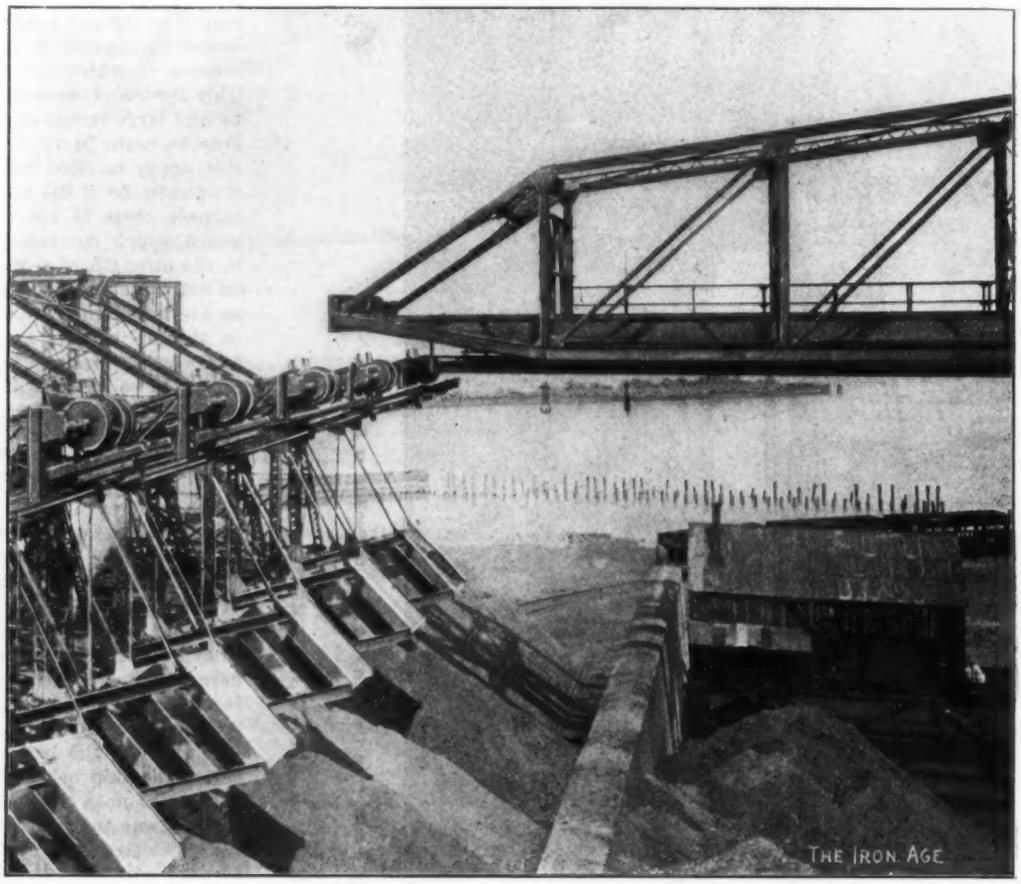

Fig. 13.—Arm of Bridge Toward the Lake and Over Concrete Trough.

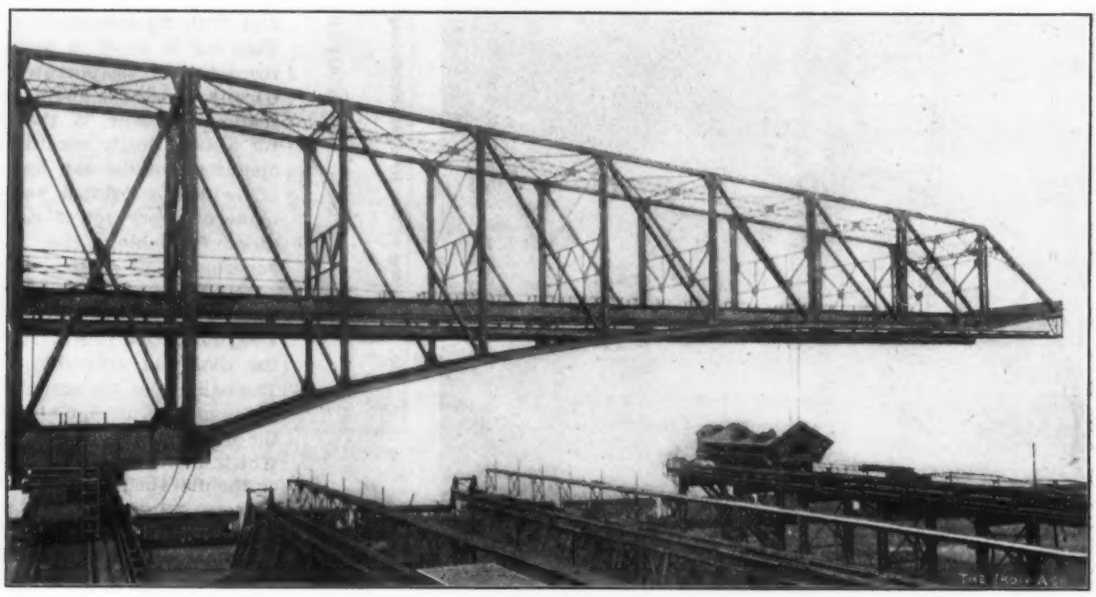

Fig. 14.—Furnace Arm of Bridge, Over Railroad Tracks and Ore Pockets.

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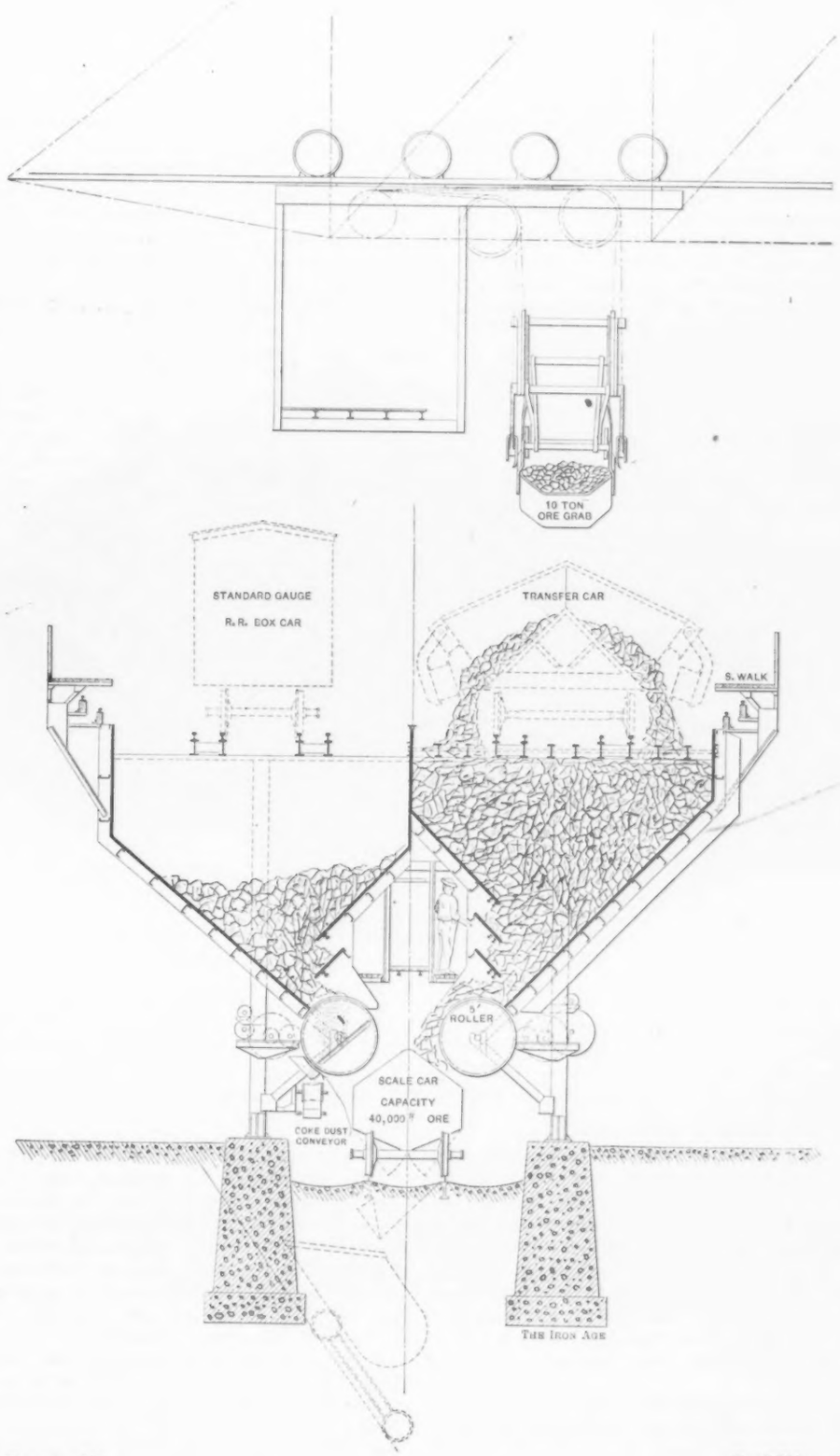
present plants and the establishment of new steel industries within the near future.

The Portsmouth & Kentucky Fire Brick Company have closed a contract for fire brick for a complete plant, furnace and stoves, for Plattsburg, N. Y. They have also orders for complete blast furnace and stove plants at Marquette, Toledo and Detroit, all new plants, besides orders for more than 6,000,000 of fire brick for the United States Coke Company, steel works and current repairs for blast furnaces all over the country.

The boundary lines of Youngstown, Ohio, are being extended so as to include the plant of the National Steel Company. It has heretofore been outside of Youngstown, but now that it is to be included within the city limits the taxation on the property will be considerably increased.



Furnace Side. Yard Side.

Fig. 15.—Cross Section of Ore Pocket, Scale Car, Furnace Skip and Overhead Arm of Ore Bridge.

THE HOOVER & MASON ORE HANDLING SYSTEM.

The American Engineer in England.

In an interesting manner Wm. G. Sloan has given to the Western Society of Engineers his experience as an engineer in England during the erection of the plant of the British Westinghouse Electric & Mfg. Company at Trafford Park, near Manchester. We quote from it as follows:

The plant was designed by Thos. Rodd of Pittsburgh, and the work of construction was intrusted to a Manchester architect, but under his supervision the work progressed so slowly that it was evident to those interested something must be done to hasten the work. It was generally conceded by English builders that it would take five years to erect the works contemplated, and now, when the proposed output of the plant was most in demand, a delay of a year or two years meant an almost inestimable loss. The question was, How can the plant be completed in the shortest possible time? The Americans interested in the business naturally looked to America for an answer to this question, and the contracting firm of James Stewart & Co. of St. Louis and Pittsburgh were asked to take hold of the work and push it through. This they agreed to do, saying they could complete the work in 15 months.

Therefore, a year ago last March, J. C. Stewart of the above firm, having gathered around him a party of six American engineers and foremen, of which party I was fortunate enough to be a member, sailed for England, and on arriving there took immediate charge of the work.

Reorganizing the Staff.

It was evident at a glance that a complete reorganization was necesssary, in the making of which we naturally met with considerable opposition, but Mr. Stewart was determined in his purpose to do the work, as far as possible, by American methods, and not many weeks passed before we had things running to our satisfaction. We found the work in charge, under an architect, of a clerk of works, who had a small office in one part of the grounds. This man had perhaps a dozen assistants, each having his little office in some part of the grounds, each seemingly as far as possible from the others. The first thing done was to build an office large enough to accommodate all the necessary force, so as to bring them under the immediate supervision and influence of the American management. All these men had been in the habit of coming on the work at 9 o'clock in the morning and leaving about 5 in the afternoon; they were requested to be on hand when the work started and to remain until quitting time, and this request caused about half of them to seek employment elsewhere, one of them saying in his letter of resignation, "A man cannot be a gentleman and work under the American administration." It may be of interest to state in this connection that the average rate of pay of these clerks and inspectors did not exceed $50 per month.

The Breakfast Hour.

One custom we had the most difficulty in breaking down was the old established one of stopping for the breakfast hour. The men started work at 7 o'clock in the morning and at 8.30 the work stopped for half an hour for the men to eat their breakfast; this consisted of bread and tea, and each man brought his tea and teapot with him to the work, and as I say, right in the best part of the morning, they all stopped work, and gathering in groups of three or four in a place, built little fires on the ground, heated the water and made their tea. You can readily understand, when you consider that at times we had as many as 3000 men at work, how serious an objection this break in morning work would be; the men losing not only the half hour between 8.30 and 9, but also wasting considerable time in stopping work and getting started again. We helped matters to a great extent by building a furnace and having the water hot for the men, making it a rule that no other fires should be lighted on the grounds. At the same time we discouraged in every way possible the keeping up of the custom, and finally, one by one, the different trades acquiesced to our wishes in the matter, and before the work was done all but the bricklayers had given up the custom.

After an interesting description of the plant Mr. Sloan continues:

Probably the question, why could an American builder, in the face of the fact that he was in a strange country, where labor was more tied down by unions than in this country, and where he might be hindered by the jealousies of men in the same profession, do this

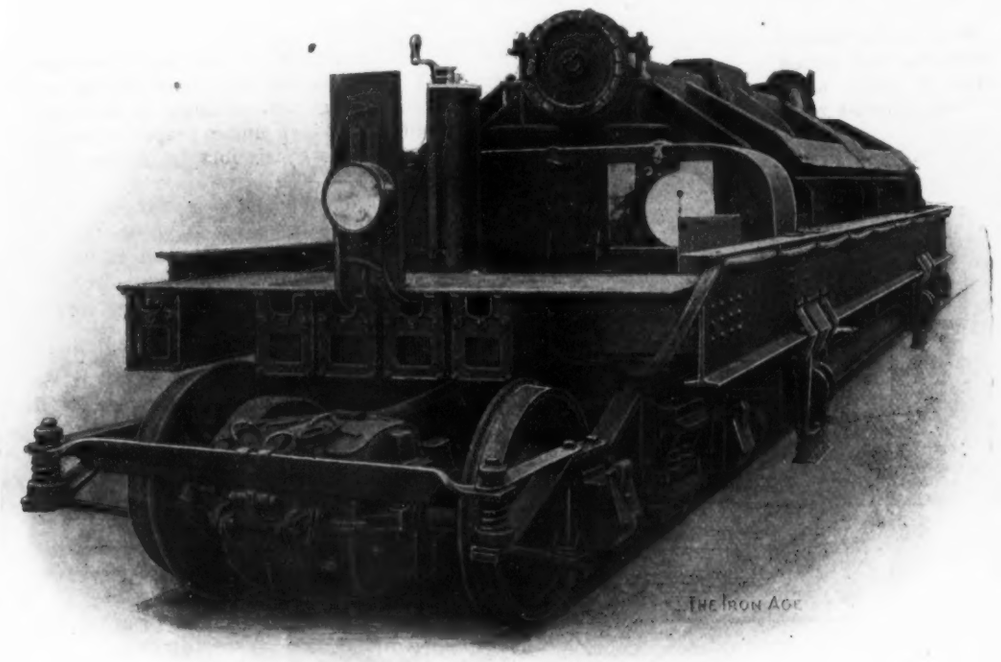


Fig. 16.—Scale Car.

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work quicker than these same men, has occurred to you.

I have already mentioned that on our arrival at the work we found a complete reorganization necessary, and I have briefly mentioned some of the changes we made. Now I wish to bring some other facts to your attention and make a few comparisons of English and American methods of doing work, and in so doing try and answer the above question.

English Methods.

The basis on which contracts are let in England is somewhat different from that in use here.

The engineer, or architect, in asking for bids on work furnishes each bidder with a bill of quantities, specifying the exact amount of each kind of work in the contract down to the most minute detail.

Having filled in the prices the contractor has but to sum up the total and his bid is complete. Thus he is entirely relieved of having to spend any time studying the plans and taking quantities therefrom. If the quantity of the work done is changed for any reason, such as being compelled to go deeper for foundations, the amount due him is changed accordingly.

The concrete was mixed in the proportion of 9 to 1, and pieces of stone not larger than one man could handle were allowed to be used, no two pieces being nearer together than 6 inches. These stones were called plums. The price does not include the forms, or, as they call it, the shuttering, which is paid for separately by the superficial yard.

The Work of Bricklayers.

If one department of our work created more comment and discussion than another, it was the work of our bricklayers. Shortly after we had taken hold of the work the fact that we were laying 900 brick per man per day was published, and from builders in all parts of the country came the cry "Impossible, the work of our bricklayers does not average over 400 or 500 brick per man per day," and yet later on, as the organization became better and the men became accustomed to our methods, this average of 900 brick per man per day was doubled on the same class of work. So much comment was made on this that, on the construction of a large brick stack, we went so far as to have the foremen make affidavit each night as to the number of brick laid and men employed on this particular piece of work. The men averaged over 1900 brick per man per day for a month, and the best day's work was 2100 brick per man per day.

In this connection I may say that the brick used in this district are larger than those we have here, being 3 x 4½ x 9 inches. This record was made possible by providing the most approved hoists for material, so as to have no delay on the part of men waiting for brick or mortar, and by the fact that we used a thinner mortar than was commonly used in England, thus saving time and labor in spreading the beds and setting the bricks in place, and that we were able to get and hold the best men by paying more than the union rate of wages, which for bricklayers is only 20 cents per hour.

I will venture to say that if you would go to 90 per cent. of the contracting engineers or builders in England, and ask, How many brick are you laying per man per day, or just what is your concrete or masonry costing you per yard in place? the answer would be, "I do not know."

Slack Methods.

That such a condition can exist is made possible by the fact that, considering the cost of material in England, the contracting prices of doing work generally are away above those of doing corresponding work in this country. To my mind this difference in cost represents what is lost by slack methods of handling work; not slack as far as quality of the work is concerned, but slack in every other way. It is something which only keen competition, such as we have in America, can overcome.

England has been pre-eminent in so many lines of industry for such a long time that she has, as it were, been resting on her laurels, not realizing that in other parts of the world tremendous advances were being made along these same lines, and that other countries were assuming an importance in the industrial and commercial world which made England's position uncertain. Some progressive Englishmen realized this long ago, some are just learning the lesson, but the great majority in their conservatism have it still to learn. Go into 99 out of 100 manufacturing establishments of any kind in England and examine the tools and appliances for doing work. You will probably find the same kind of machines used there to-day which were used and discarded in this country 25 years ago. So long as a machine does its work it is satisfactory; the Englishman has not yet come to the point where, by sitting down and carefully figuring out his cost account, he finds that it may be economy to discard a machine, even though it is doing good work, and replace it by one which will do that same work quicker and at less cost. It has been well said, "The English manufacturer does not know the value of a scrap pile."

The English Employer.

The English employer is prone to lay the blame for England's decline in trade on the workmen with whom he has to deal, but Mr. Stewart's achievement in Manchester is a shining example of what can be done with English workmen under proper management. Generally speaking, the trouble in England is not with the labor, but with the managers.

Slack management is not, nor can it be, conducive to anything but slackness on the part of those managed. On the Manchester work at the end of each day the foremen in charge of the several classes of work each turned into the office a report showing the progress made that day—*i.e.*, tons of steel erected, yards of concrete put in, number of brick laid, square feet skylight put up, &c., covering every branch of trade at work on the buildings as the case might be, and the number of men employed in doing the work. Thus at a glance Mr. Stewart could tell just how much work the men were doing and what the work was costing, and being a man who knows how much work ought to be done, and what work should cost, if things were not going right he took such steps as were necessary to make them so.

The success, then, of this work lies chiefly in the high personal influence of Mr. Stewart and the willing service of those he selected as his submanagers and assistants, and to the fact that careful records of each day's work were kept and used, and that the most approved machinery was employed to help the work along wherever possible; I mean mortar mixers, concrete mixers, brick hoists, painting machines, and a saw mill sufficiently large, so that no cutting of timber for floors or roofs or fitting of sash was done by hand.

The effect of this work in England is that Mr. Stewart is welcomed, and his methods proclaimed by English builders to be the salvation of that line of work there, and this in spite of the fact that he is to be a most dangerous competitor to them.

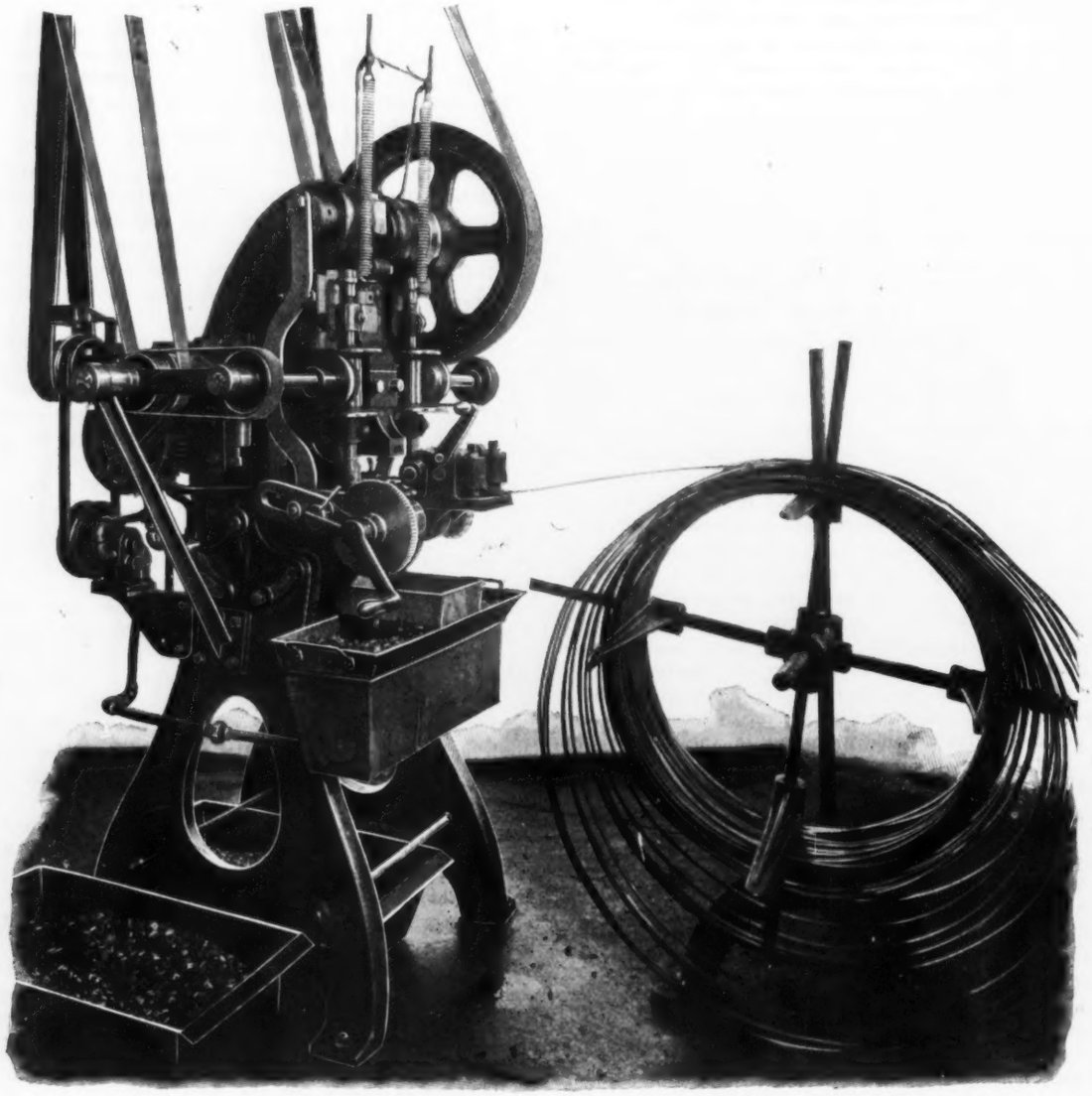
There is a future for the American who can go to England and take American methods with him, and while it is to be expected he will meet some opposition at first, yet in the end he is bound to win out.

The Americanization of England, to my mind, is bound to come, and its day is not far distant.

Welded Steel Barrels.—The Pittsburgh Welded Steel Package Company, in which several of the officials of the American Nut & Bolt Fastener Company are interested, have been organized with a capital of $100,000. The new company propose to build a plant adjacent to the bolt fastener plant on the Pennsylvania Railroad in Pittsburgh, to manufacture welded steel barrels. The barrels will be made of 30-gauge steel, to carry liquids, including acids, across the ocean. Among the capitalists interested in the new company are Milton Bartley, the patentee of the steel barrel, David Winters and Barton Grubbs. The new plant will be equipped with specially designed machinery to produce the package cheaply and in large quantities.

The Ray Automatic Nut Machine.

The accompanying half-tone illustrates an automatic machine for making nuts which is the invention of A. D. Ray and is built by the Ray Automatic Machine Company of Cleveland, Ohio. The machine provides for the punching of the nut, piercing the hole, chamfering the corners and cutting the thread. The finished nuts are ejected alternately from each side at the rate of 30,000 a day. The stock is fed to the punch from the coil upon the reel. All the operations of the machine are governed by a cam shaft at the rear, whereby each working part is properly timed. The punch plunger pierces the hole and punches the nut from the blank strip. The nut is then carried into a way in the bed and led to the tapping spindle. After the thread has been cut the tap is reversed and backed out. A tapping spindle at each side of the machine provides for the alternate carrying and tapping of the nut—that is, while one nut is being tapped under one spindle another is being punched and carried forward under the other spindle, so that there is no lost time. The machine makes any style of nut, and by the addition of an extra spindle nut shown in the engraving it will work pieces of irregular shape.



THE RAY AUTOMATIC NUT MACHINE.

Brazilian Engineers Visit Niagara Falls Power Plant.—Recent visitors at Niagara Falls were Adolpho Aschoff and Edouard Guinle, both of Rio de Janeiro, Brazil. These gentlemen are electrical engineers, and they are in this country to inspect the Niagara power development. They are particularly interested because it is intended to combine the various electrical plants about their home city in one plant, if possible, the changes to call for an expenditure of some $15,000,000. A plant to develop 40,000 horse-power will be installed. The men mentioned represent the General Electric Company of Rio de Janeiro. At present the company have a plant of 15,000 horse-power at San Paolo, the capital of the State of San Paolo, a city of 250,000 people. The power is obtained from the Tiete River, 20 miles from the city. The plan in which Messrs. Aschoff and Guinle are particularly interested is the development of a new power on the Paramiba River, about 90 miles from Rio de Janeiro. Mr. Aschoff was a member of the Brazil World's Fair Commission, and Mr. Guinle has spent quite a little time in this country, having received the best part of his education here. Both of these prominent engineers recognize in Niagara the model power plant of the world.

Steel Car Wheel Plant.—Charles T. Schoen, formerly identified with the Pressed Steel Car Company, at Pittsburgh, proposes to build a large plant at Butler, Pa., in which steel car wheels will be made by an entirely new process. Mr. Schoen has secured 40 acres of ground, adjoining the new plant of the Standard Steel Car Company. Construction will be started by the first of the year, and it is expected to be completed inside of 12 months. For some time the Bethlehem Steel Company, at South Bethlehem, Pa., have been making wheels under this process, and it is said they have proved entirely successful. Much of the equipment for the new plant will be made by the Bethlehem Steel Company, including a forging press that will weigh 400,000 pounds. The

plant will also include three open hearth steel furnaces of 50 tons capacity each. The output at the start is expected to be about 400 wheels per day.

Canadian Notes.

Ontario's Mineral Production.

TORONTO, CAN., August 30, 1902.—The report of the Ontario Bureau of Mines, covering the calendar year 1901 and the first quarter of the current year, has just appeared. Of metallic minerals the output for 1901 was as follows:

	Quantity.	Value.
Gold, ounces	14,293	$244,443
Silver, ounces	151,400	84,830
Copper, pounds	9,074,000	589,080
Nickel, pounds	8,882,000	1,859,970
Iron ore, tons	273,538	174,428
Pig iron, tons	116,370	1,701,703
Steel, tons	14,471	347,280
Zinc ore, tons	1,500	15,000
Total		$5,016,734

The metals showing the chief gain in 1901 are copper, nickel, pig iron and steel. Commenting on the seeming disparity between the increase in value and the increase in quantity of nickel as compared in these reports with the output for 1900, the Director says: "About the middle of the year 1901 the Ontario Smelting Works, erected by Colonel R. M. Thompson, at Copper Cliff, for the purpose of re-treating the low grade mattes made in the furnaces of the Canadian Copper Company, began operations, the effect of the re-treatment being to raise the metallic contents of the matte from, say, 30 up to about 70 per cent. Additional labor and expense having thus been expended upon the mattes, and the metals contained in them having been brought so much nearer the point of actual refinement and separation, it follows that the contents were worth more per pound in the high grade than in the low grade condition."

As to nickel production in 1901 the Director says it was kept up by the Canadian Copper Company at Copper Cliff, the Mond Nickel Company at Victoria Mines, and the Lake Superior Power Company. The last named, while not yet turning out matte, have opened up the Gertrude and Elsie mines, the roasting being done at the Gertrude, where smelting works are being erected. Picked ore from the Gertrude, containing little or no copper, is taken to the company's reduction works at Sault Ste. Marie. At Victoria Mines the Mond Nickel Company's plant began turning out matte during the year by the Bessemer process. The product is a high grade article carrying about 80 per cent. metallic contents in equal proportions of nickel and copper, the iron being almost eliminated. The matte is sent to Great Britain, where it is refined near Swansea, Wales, by Dr. Mond's own process.

Iron Ore, Pig Iron and Steel.

Far the greater part of the domestic ore produced in 1901 came from the Helen Mine, in the Michipicoten mining division. Its shipments in that year were as follows: To Midland furnace, 11,574 tons; to Hamilton furnace, 66,330 tons; to Ashatabula, Ohio, 98,213 tons; to Buffalo, N. Y., 65,612 tons; to Cleveland, Ohio, 17,026 tons; total, 258,755 tons. The iron mines in Eastern Ontario are prevented from exporting to Pennsylvania by the duty on ore. There is also the difficulty that in some of the deposits sulphur occurs in increasing proportions with the depth attained. This ingredient unfits the ore for charcoal smelting. Consequently the blast furnace at Deseronto, in which charcoal is used, has been supplied so far with Lake Superior ore. In Grattan township, Renfrew County, the Canada Iron Furnace Company are opening up what promises to be a deposit of first-class magnetite ore. It has been tested satisfactorily in the company's furnace at Radnor Forges, Quebec, and if the supply is as large as is expected the ore will be mixed with Helen mine ore at the Midland furnace.

Says the Director in his report: "The unprecedented demand prevailing for iron and steel in the United States and the enormous drafts which are in consequence being made on the known sources of ore supply in that country are very greatly stimulating the search for workable ore bodies in this province. This is true especially of that portion of Ontario lying west of Port Arthur and contiguous to the international boundary, now traversed from east to west by the Canadian Northern (formerly the Ontario & Rainy River) Railway, the district adjoining Lake Nepigon on the east and west, the Michipicoten mining division, and other sections tributary to Lake Superior. A very large extent of iron ranges has been located in these and other districts of the province, and in many parts of such ranges explorations are being vigorously conducted in the hope of finding deposits of ore of commercial size and quality. A good deal of prospecting was done last year by the Lake Superior Power Company, and others in the region lying east of Lake Nepigon, as far inland as Long Lake, and some of the more promising indications were tried by the diamond drill. The banded magnetite and jasper which outcrops on the surface has so far not proved to be underlaid with bodies of good ore, but the points at which it has been properly or sufficiently tested are few in number. The investigations carried on for the Bureau of Mines by Professor Miller in the northern part of Nipissing district last year and the year previous, and by Professor Coleman in Western Ontario for several years past, show conclusively that if surface indications and geological conditions are any guide, the discovery of important bodies of iron ores on the Ontario side of the line may be confidently looked for."

Reference is made to the diamond drilling that was carried on last year on the Atikokan and Mattawin ranges, and it is stated that these were without much definite result, except that considerable ore was found on the latter, though too low in iron to be of present value. On the shores of Steep Rock Lake float hematite of excellent quality, found in the drift, has led to the active taking up of mining locations, and work on some of these is being done to test their value.

Of the 194,510 tons of iron ore smelted in Ontario in 1901, 109,109 tons came from Ontario mines, and 85,401 tons from the United States.

"The steel making department of the Hamilton Steel & Iron Company's plant," says the report, "produces an excellent quality of open hearth steel, and in April, 1902, the Lake Superior Power Company's steel mill at Sault Ste. Marie began operations, converting pig iron, mainly from the Midland furnace, into Bessemer steel. The product of the Sault Ste. Marie plant will be ingots, rails, beams, channels and other structural shapes, and the annual capacity will be 200,000 gross tons of ingots and 180,000 tons of finished product. A plant for the manufacture of steel is now being constructed at Collingwood by the Cramp Steel Company, Limited, whose head office is 608 Temple Building, Toronto. Both the Bessemer and open hearth processes will be employed, and the product will be steel rails, beams, bar iron, rods, &c. The mill will have an estimated annual capacity of 200,000 tons. The company also propose to erect two furnaces for making coke iron, with a daily capacity of 250 tons each."

The $25,000 annual provincial bounty on pig iron made from Ontario ore was distributed as follows in 1901:

Hamilton Steel & Iron Company	$9,993.00
Canada Iron Furnace Company	14,108.46
H. C. Farnham, L'Aimable Station	345.93
Stephen Wellington, Madoc	35.35
Leopold Meyer, Ottawa	364.24
T. C. Gordon, Ottawa	119.39
Sewmillie Iron Company, Belleville	33.63
Total	$25,000.00

Iron Ranges of Northwestern Ontario.

Professor Coleman's report on the iron ranges of Northwestern Ontario is included in the volume. He gives geological descriptions of the formations in which iron occurs in Conmee township, along the Canadian Northern Railway on the Atikokan River, on Steep Rock Lake, in Hatton and Watten townships, near Dryden, on the Slate Islands, and in other localities, but says nothing very positive about the probable quantity or quality of the iron in them.

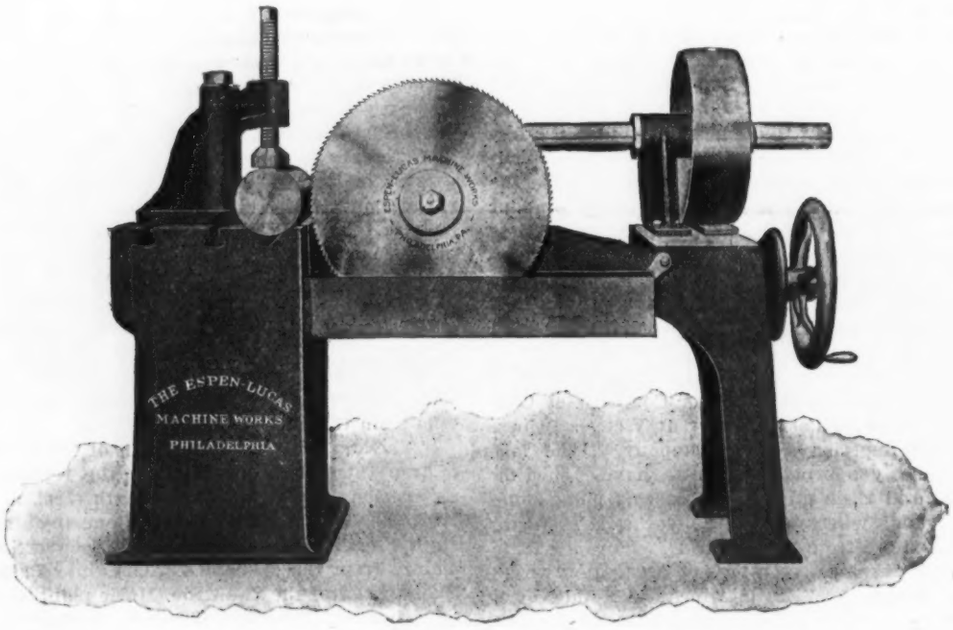
Similarly the Michipicoten iron range is the subject of a report by Professor Coleman and Professor Willmott. Describing the Helen iron range, they say the iron deposit there is in two long fingers reaching eastward to the shore of Talbot Lake, but not crossing it. The southern finger, long and narrow, possibly reaches a short distance into the lake, but does not appear on the opposite side. It extends eastwardly up the valley of a small creek until it reaches the main body of the formation near Sayers Lake. Following the boundary northward are several minor folds which are seen to rest on Wawa tuffs. Then crossing the railway track near the outlet of the lake, the range extends westward down to the shore of the lake, where it comes to an end within a few feet of the shore, being bottomed by Wawa tuffs.

Details are gone into to show the similarity between the Vermillion range in Minnesota and the Michipicoten range on the Ontario side of Lake Superior. "Many thousand dollars," say Professors Coleman and Willmott, "have been expended on the Vermillion range hunting for iron ores, some of which have been misspent in drilling green schists and Ely greenstones, while other parts of it have been lost in drilling in iron formation itself, but with no results. Only two localities have been productive, the one at Tower and the other at Ely, 23 miles apart. If the analogy of the Michipicoten range with the Vermillion is perfect it must be assumed that many of the iron hills shown on the accompanying map of Michipicoten will likewise prove barren. Indeed, if out of the areas shown on the map two productive areas at the Helen and Josephine are found, it is perhaps all that can be expected; nevertheless, as already mentioned, there are some possibilities of finding ore in other belts." C. A. C. J.

The Empire Iron & Steel Company.—The product of the new plant of the Empire Iron & Steel Company, at Niles, Ohio, will be sheet steel and angles for light structural work. The plant will contain six hot mills, two cold mills and a three-high 24-inch bar mill. Iron and steel sheets will be made up to 60 inches wide and from 16 to 30 gauge. Specialties will be guaranteed double refined iron sheets, range steel and Bowsocket polished sheets. The output of iron and steel angles will be about 100 tons per day, and for the present the heaviest angles the company will roll will be 4 x 4 inch. They expect to start their plant about October 1, but the galvanizing plant, which is being erected, will not be ready for operation before about January 1. The company have effected an organization by electing Wade A. Taylor president and treasurer; Charles S. Thomas, vice-president and manager, and J. F. O'Dea, secretary.

The Espen-Lucas Cold Saw Cutting Off Machine.

Simplicity of design is the principal characteristic of the new cold saw cutting off machine designed by William H. Lucas and built by the Espen-Lucas Machine Works of Philadelphia. These are built in three styles for bar, steel foundry and I beams, and there are three sizes of each pattern. The base is an extra heavy casting, insuring great stability. The clamp for holding the work in the V or on the table is held in place by a heavy bolt, and as it is swiveled it can be quickly adjusted to hold odd shapes or for cutting work on an angle, or it may be entirely removed and the table used for gig or special work. Saw blades 3-16 inch in thickness and 22 inches in diameter are used, the feed being automatic with automatic safety stops controlling the depth of cut and variable from ¼ to 1½ inches per minute. Phosphor bronze worm gears are used on the No. 2 and No. 3 machines, while the No. 1 machines are supplied with spur gears. The capacity of the No. 2 saw is 6 inches round or square. The lubrication of the saw is provided for by an oil box in which it constantly revolves.



THE ESPEN-LUCAS COLD SAW CUTTING OFF MACHINE.

The relining and other repairs which have been in progress on the furnace of the Peninsular Iron Company at Detroit are about completed, and it is now expected that the furnace will be ready to blow in not later than September 20. This stack, which has been idle for about a year and a half, produces car wheel and iron for malleable castings. It now resumes operations conducted by the Peninsular Iron Mfg. Company, Limited. The Detroit furnace, which is also a charcoal plant and previously owned by the Detroit Iron Works, is rapidly nearing completion. It is expected that the stack will be ready to blow in about January 1, 1903. This furnace will be operated by the Wayne Iron Company, Limited. Stocks of ore have been accumulated in sufficient quantity to keep the furnace in full blast until additional supplies can be secured by lake transportation in the spring of 1903. The fuel, charcoal, is supplied by those who are financially interested in the operating companies and is being shipped from the vicinity of Thompsonville, Benzie County, Mich. Both furnaces are under the management of Solon Burt.

Lake Superior Ore News.

DULUTH, MINN., August 30, 1902.—Records of ore shipments for the month have not been made up, but it is probable that the Duluth, Missabe & Northern will again lead upper lake roads with a tonnage for August of about 925,000 tons. The road serves the Hibbing group of the Minnesota Iron Company, nine mines; the Mountain Iron, with its intended output of 1,000,000 tons this year; the Adams and Spruce at Eveleth and the Biwabik. Adams and Spruce have made a remarkable record so far this year and will end the season not far behind Fayal. Up to the end of August they have sent down better than 1,200,000 tons, of which Adams has produced about 875,000. The two mines are worked in common, with J. H. Hearding in supervision. They are entirely underground. Adams has an electric tramming system that works to perfection and will be materially extended.

On all ranges stock piles are pretty well cleaned up and shipment for the remainder of the year will be somewhat slackened in consequence. But up to date it is so far ahead of any preceding year and at the slackened pace shipments will still be so much heavier than in the corresponding period of any previous seasons that the estimated output for the year remains as large as ever. From now on shipping interests will be kept more busy in other lines of tonnage, and there will be an element of competition in freight rates which may later have a stiffening tendency. Grain will be a large factor in lake transportation shortly.

Mesaba Range.

A large amount of new stripping work is planned for the Mesaba range the coming year. Contracts are being closed at Duluth now for the removal of 1,250,000 cubic yards from the Hawkins mine of the Deering Harvester Company. This work will require a number of years for completion. The Minnesota Iron Company are figuring on a large additional stripping at their Duluth mine, and will probably do the work themselves. The same company's Hull mine will probably be stripped, commencing another year, and this will be a job that will take a long time, as the work will be exceedingly heavy. The increase in the earthwork to be done on this range is bringing in numerous large contracting firms, who have previously devoted themselves almost exclusively to railroad work. There are now six or eight heavy firms operating on the range in place of two less than a year ago. Then in spite of the increased cost of labor and equipment stripping is being taken at lower prices than formerly. One large contract was closed a few weeks ago at 28 cents a yard, and the price at which some of the older contracts are now adjusted runs down to 27 cents. On account of the advance in the general price of labor and of mining timber there is a tendency to strip a greater overburden than formerly, and a stripping of 60 feet is not now regarded as particularly serious. A large number of shovels will have to be brought into the range the coming winter, both by mining companies and contractors.

The Minnesota Iron Company are commencing work on a new mine east from Hibbing about 5 miles, and in the southeast quarter of the northwest quarter of section 23 T 58 R 20. It is to be called "St. Clair," and will be an underground property. There are supposed to be from 4,000,000 to 6,000,000 tons of excellent ore in the deposit. It will probably be reached by an extension of the Duluth, Missabe & Northern spur, now running to the Shenango, and will be a considerable shipper in 1903.

Besides their work surrounding the Hawkins mine in 31 and 32, T 57 R 22, the Cleveland Cliffs Company are operating a number of drills in and about section 11 T 56 R 23, where the Great Northern road has several State tracts under lease and where some ore has been shown. The number of drills working on the west end of the range continues to grow, but results do not come in proportionately fast. Some work is likely to start on the extreme east, in T 59 R 14, where it is said that drills will be put on sections 20, 21 and 22. It is claimed that the work done there two or three years ago was not conclusive. It was conclusive enough, however, for those who did it.

Menominee Range.

A three-compartment shaft will be sunk at the Florence mine, to take the place of No. 4 and become the main shaft of the property. It will be raised simultaneously from three levels. The Florence is looking well and is producing about 1000 tons daily. The Bird Iron Company have dropped the James exploration after having spent about $70,000 there in the search for ore. A shaft has been sunk 300 feet. At the Tobin the operators are shipping their stock as fast as possible, and a remarkable record was made a few days ago in loading cars, 2750 tons into 50-ton cars with a 65-ton shovel in five hours. The same parties will get out what ore remains in the old Dunn mine in the open pit. Work at the old Groveland will also be undertaken by them soon.

Antoine Ore Company have sold their Traders mine, at Iron Mountain, to the Republic Iron & Steel Company. This is a large deposit of lean siliceous ore running about 0.025 in phosphorus and is easily mined. It is stripped and is mined during the shipping season. It is valuable as mixture for nonsiliceous ores. The sale doubtless means a larger output and more steady operation than for the past few years.

The Nanimo mine at Iron River will resume work soon, a lease having been closed by the owners. It was a large property at one time, and shipped in early years 130,000 tons. A tract of land adjoining the Michigan and Hemlock mines is to be leased and will be explored at once. At the Columbia more ore is going down than at any time in its history. The large stock piles will be cleaned away. No new ore bodies are being found underground, though much exploratory work is under way.

Miscellaneous.

E. F. Bradt, superintendent of mines for the Clergue Syndicate, is now in White River, Ontario, west of Michipicoton, where the syndicate are exposing what seems to be a fine hematite prospect. The ore is at considerable depth and is of excellent quality. The company's Josephine mine is also looking well and is expected to develop into an important Bessemer property. A recent sale of the Pickands, Mather & Co. interests to this syndicate included everything in ore lands held by that company in Ontario.

Ore shipments from the Marquette range for August have been the largest on record, but the coming month is expected to show a decrease. The docks of the Cleveland Cliffs Railway have been particularly lively of late.

At the copper prospect worked by John W. Gates in the southeastern part of Douglas County, Wis., on what is locally known as the "Minong range," and which is an extension of the Keewenawan formation of Houghton County, quite favorable indications are being found; though the rock runs rather more heavily to mass and barrel work and less to stamp copper than might be desired. At the present time no other work of importance is under way in that district. D. E. W.

The American Brazing Company.

The American Ferrofix Company have been incorporated in New Jersey under the name of American Brazing Company, offices and works at 532 West Twenty-second street, New York. The new company, with a capital of $2,000,000, propose to engage in the business of brazing metals and in the introduction of a preparation used for this purpose.

Their process, which is particularly useful for brazing cast iron, consists in the employment of a compound which is spread upon the broken surfaces of the casting. The parts are then brought together and heated under a blow pipe, if small, or over a coke fire, if large, to a bright red. The effect of this is to decarbonize the iron in the immediate neighborhood of the break. The heat being continued, the joint is brazed with brass in the usual way. The union is perfect, and as the brass alloy possesses greater strength than the iron itself the joint is better able to resist strain than any other part of the piece of like sectional area. The process has been successfully applied to the mending of broken pulleys, teeth

of gears, frames of all kinds, press housings, &c. It is claimed that any cast iron piece which can be heated properly can be repaired successfully.

The Miller Air or Liquid Pump.

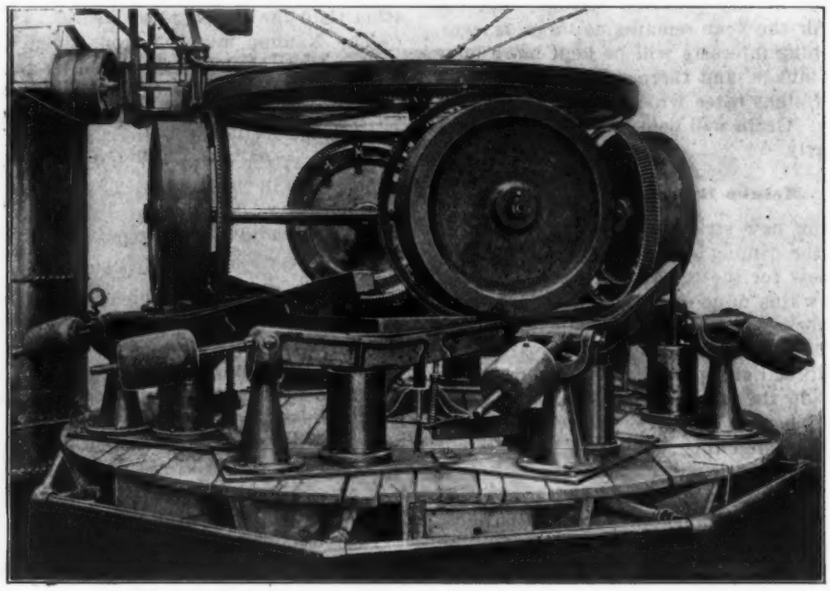
In *The Iron Age* of July 23, 1896, we described and illustrated very completely the Chaquette air compressor built at Bridgeport, Conn. This was the most stupendous effort ever made to capture that *ignus fatuus*, perpetual motion, or to obtain something for nothing. In theory it was false from the foundation up; in design it possessed many beautiful features; as a mechanical construction it was gigantic; as an investment it cost $100,000; the result, it was sold under the hammer and brought less than $5000 as junk.

The explanation of its action was refreshingly simple and remarkable for its muddy lucidity. A heavy weight rolled along a path could be made to do a little work and never know the difference. This was demonstrated by loading a truck, driving a few nails part way into the floor, then blindfolding a man and having him draw the truck over the nails, which were forced entirely into the floor by the wheels. The secret was revealed and Dame Nature was astounded at the audacity of an experiment which revealed her inmost laws. Man, full of wisdom and knowledge even when blindfolded, could not detect when the wheel drove the nail into the floor; ergo, how could a lump of iron, not a sentient being, perceive what man could not? Therefore, since neither the man nor the truck knew they had done any work in driving nails, they had lost no power.*

The principle having been demonstrated and, incidentally, sufficient capital having been secured, it was only necessary to put the idea to practical use and, again incidentally, of course, gather in the shekels. So the men of Bridgeport made them a motor that was to run everything in the town except the Mayor. Mechanically, it was a splendid piece of work, made upon the interchangeable plan although repairs would never be needed, no variation of more than one-quarter of a thousandth allowed, bearings scraped to a fit, and so on. But there was one serious drawback—the thing wouldn't work. That was its only disadvantage; in all other aspects it was simply dear (lovely and $100,000 here implied). A big tank, which had been made to hold the compressed air and the talents of gold and of silver, never had an ounce of the one nor a grain of the others in its midst. So the promoters fell down, the company fell down and the machine fell under the hammer. Peace to its scrap.

The machine consisted of a horizontally disposed circular frame over 80 feet in diameter. This frame was formed with ten spokes, each of which carried at its outer end a cast iron wheel weighing some 15 tons, or 150 tons for all the wheels. These wheels were loosely mounted on their journals and traveled around a track. The frame was mounted on a pivot at its center and was turned by an engine through suitable gearing. In the path of the wheels were placed 100 air compressors, 50 within and 50 without the circle. These were arranged in pairs and the pistons of each pair were connected to the same lever. The levers were placed in the path of the heavy wheels and were so disposed as to be operate by them in their travel around the circle. The levers resembled the walking beams of a steamboat except that they had a piston at each end. At each revolution of the frame there were 200 strokes of the pistons.

The scheme will now be understood. Here was a weight of 150 tons, not counting the frame, moving along a level path. This great weight would actuate the levers and the compressors thereby be brought into operation. The boiler supplying the engine by which the frame was moved was only an incident. It was to be used only to start the machine and run it until the tank had been filled with air at a certain pressure. Then it was to be cut out and the air used to drive the engine.



THE MILLER AIR OR LIQUID PUMP.

It is only at this point of our story that the wonderful simplicity and transcendent money making power of the plan come into evidence. Mr. Chaquette said that out of 100 horse-power generated by the machine he only required 5-horse-power, or 5 per cent., to run the machine. He therefore had 95 horse-power out of every 100 produced to sell to the power consumers of Bridgeport and the rest of the United States. This meant that if you gave him 1 horse-power he would hand you back 19. Each one of these 19 horse-power could be made to yield another 19, and so on. This is a progressive ratio, marvelous in its possibilities. A few of these plants, properly located, would do all the work of mankind, and there would still be enough power left to rock the cradle of industry.

But if Mr. Chaquette could return 19 for 1 why did he want even the 1? Why didn't he give 20 for nothing? Simply because he needed it in his business. He could multiply power—that was easy—but he could not overcome friction. Therefore he had to have just a little to run his machine because he did not know how to annihilate that bugbear, friction.

The Miller Pump.

J. B. Miller of Muncie, Ind., is not blushingly and retiringly modest in the claims he makes for his apparatus. The following simple statement explains the position of

* These experiments were actually performed and were used as an argument in favor of the correctness of the Chaquette theory—that a moving mass could be made to do work and not lose any of its power.

this inventor: "I made the discovery many years ago where all power is lost." We first describe the machine, using information furnished by Mr. Miller as far as possible.

The machine, as shown in the engraving, is built on a platform upon which are placed eight iron plates for the eight pumps and posts to rest upon. The track is octagonal in shape and along each side is a lever, one end of which is attached to a pump plunger, which is 9 inches in diameter and has a 12-inch stroke. At the other end of each lever is a weight acting as a balance. The piston ends of the levers rise 12 inches above the track. Moving around the track are four wheels weighing together 14,000 pounds. On the shaft of each wheel is a bevel gear engaging a large bevel gear mounted on the central pivot and which is driven by a belt. In this way the four wheels are made to revolve around the track and operate the plungers.

The levers are balanced, we are told, as the beam on a pair of scales and "there is no power lost in this machine. All the actual power necessary to operate this machine is to roll these four wheels." Here is the inventor's explanation of this phenomenon: "Now for an illustration you can load a railroad car with 100,000 pounds and, having the car on a level track, you can take a pinch bar and start the car to moving, and after it is once started one man can keep it moving by pushing the same. Now take the weight of this 100,000 pounds as a power producer; it means 100,000 pounds power by the aid of one man power. This power producer is nothing more than a rolling weight." This is the Chaquette idea revivified as the late Mr. Keeley of motor fame would express it. "The machine now built is but 10 feet in diameter, while if it was 30 feet in diameter, so as to give the wheels greater momentum, the large machine could then be operated with less power than the small one." The wheels move forward and never find out that they are doing any work. The inventor claims that this machine will save at least 95 per cent. of the power now required by any other machine in use. The inventor does not claim any perpetual motion, he merely says that he has "accomplished some better things." "This machine could pump 800 gallons of water 50 feet high per minute with an expenditure of 3 horse-power." This means that with 3 horse-power this contrivance would actually exert 10 horse-power, as represented by the 800 gallons lifted 50 feet a minute. While this is not perpetual motion it is a fine example of the multiplication of power; but this is a ratio of only 3 to 1 instead of 19 to 1. The Connecticut inventor still leads the Indiana inventor by a ratio of at least 6 to 1.

History repeats itself even in vagaries. These two machines are precisely alike, except as to unimportant details. Both depend upon heavy rolling weights which unknowingly operate pump pistons. In both the cylinders are arranged around a circular path, and for both extraordinarily absurd claims are advanced. History also repeats itself in the fact that bright men can be fooled in the most ridiculous way and, again incidentally, made to give up their dollars.

"M. F." Brand Tin Roofing.

An interesting discussion recently arose as to the origin of the "M. F." brand of roofing tin, which is being put on the market by the American Tin Plate Company, and of which W. C. Cronemeyer, Carnegie Building, Pittsburgh, is special agent. The supposition was that the letters "M. F." stood for "Most Favored," but, in order to remove any doubt in the matter, Mr. Cronemeyer addressed a letter to Margam & Mansel Tin Plate Works, Port Talbot, Glamorganshire, England, making inquiries as to the origin of this brand. In reply Mr. Cronemeyer received a letter from Sydney H. Byass, a copy of which we have been able to secure and which reads as follows:

"In reply to your favor of the 17th inst., I thank you for sending me one of your new booklets, and with regard to the origin of the letters 'M. F.' I do not think that any of the theories which have been advanced to you are correct, but, as a matter of fact, the letters stand for 'Margam Forge.' I have not been able to absolutely make certain that this is the case, but it is more than probable that this is the correct solution, as at this works the brand was first made, and in fact was made here until four or five years ago, when the works were dismantled. They are still known by the name of 'M. F.' among the old workmen."

The process under which the "M. F." brand of roofing tin is made has proved to be successful in producing a roofing tin of lasting qualities. Since being acquired by the American Tin Plate Company the process has been considerably improved. We may state that the U. S. Eagle brand of roofing tin, made by the United States Iron & Tin Plate Company in this country years ago, was made by the same process as the "M. F." brand. The main improvement in the process made by the American Tin Plate Company was in giving the plates a bath in oily substances, horizontally instead of vertically. By this process the common fault of allowing a large part of the coating to adhere to the lower edge of the plate when it is removed vertically from the tinning pot is overcome and the coating is distributed evenly over the entire surface of the sheet.

American Electrical Machinery for England.

The last of the main generators and engines intended to be installed in the power plant of the Mersey Tunnel Railway are about to be shipped from the Westinghouse Works at East Pittsburgh. These generators are of the railway type (1200 kw., 650 volts, 90 revolutions per minute), and are to be direct connected to vertical cross compound Westinghouse Corliss engines of 1500 horse-power each. The power house lighting and the electric light of all stations, sidings, &c., will be supplied from a separate generating plant, comprising two compound wound generators, each having a capacity of 200 kw. at 650 volts, direct connected to compound engines and running at a speed of 250 revolutions per minute. The power generating plant will have an aggregate output of about 6600 horse-power—6000 horse-power for the railway proper and 600 horse-power for lighting. The electro pneumatic system of train control is to be used and the cars will be equipped with Westinghouse high speed air brakes. The rolling stock will consist of 60 cars, each about 60 feet in length. The train will be formed of five cars each, the first and last cars of a train being motor cars equipped with four 100 horse-power motors each.

The Mersey Railway connects Liverpool and Birkenhead, passing under the River Mersey. The tunnel is double tracked. The route of the railway is about 4½ miles long, the total length of track, including sidings, being about 12 miles long. Its situation is unique, joining two such important business cities, between which the only competition in the transportation of passengers and freight is given by ferryboats on the river, and the traffic on the line is large. The number of passengers carried amounted to between 7,000,000 and 8,000,000 per year, even with the old steam locomotive system.

The railway is standard gauge, laid in accordance with heavy steam railway practice, the rails being of the ordinary English bullhead type, weighing 86 pounds per yard. The line is to be fitted with the third-rail system, the conductor rail to be laid alongside and just outside of the running track. The running rails will not be used as the return electrical conductor, but a fourth rail is to be placed between them solely for this purpose. This will entirely prevent any destruction of the track rails or buried pipes in the vicinity by electrolytic action. The third and fourth rails will be similar in size and in arrangement. They are to be of T-section, 60 feet in length and to weigh 100 pounds per yard. They will be effectively bonded and carried on stoneware insulators spaced at intervals of 7 or 8 feet apart.

It is expected that the trains will run on a three-minute service. The tunnel and the seven stations of the system are to be electrically lighted throughout. The power generating station, the machinery and the track work are all being pushed rapidly to completion.

The Bascule Bridge at West Division Street, Chicago.

The design of the new bridge at West Division street, Chicago, is that of a fixed center, double leaf, counterbalanced bascule bridge. Each leaf has three through trusses operated by racks on their curved tail ends, the tail ends descending into a pocket or tail pit in the abutments when the bridge is open. The total width of the structure is 60 feet, the trusses being 21 feet, center to center, and the sidewalks being carried by 9-foot cantilever brackets. The pivot bearings are 6 feet back from the center lines of the river piers and are carried by box girders spanning the tail pits in the abutments. The approaches are carried by I-beams, supported by cross girders resting on the box girders and extending from the river piers to concrete abutments independent of the abutments of the moving span. The approach roadway, Fig. 2, is paved with 6½-inch paving blocks on 1 inch of sand, laid on a concrete base upon steel buckle plates between the floor beams. The sidewalks are of concrete. The moving part of the bridge has a wooden floor for both roadways and sidewalks. The bridge turns through a maximum angle of 76 degrees 58 minutes, which requires a travel of 35 feet on the pitch line of the rack. The break in the roadway is on the river side of the pivot.

The principal counterweight of each leaf is contained in a girder like box, Fig. 1, which is built transversely to and connected with the three trusses just below the rear ends of the box girders supporting the trusses and as far back as clearance of supports will allow. This forms a substantial connection between the truss arcs at their lower ends, permits freedom in form and material of counterweight, and gives a maximum effective radius of the counterweight.

The machinery for operating each leaf, Fig. 3, is placed under the approach roadway. Each leaf is operated by means of three pinions, each gearing with a rack on the curved tail end of each truss. The teeth on this rack have openings between them, preventing the clogging of the rack by dirt or ice, the teeth of the operating pinion dislodging any accumulation, which would then fall through the rack. Along the top of the abutment extends a shaft carrying three pinions and having two sets of driving gear. Each set of driving gear is driven by an electric motor of 38 horse-power. On each motor driven shaft is a wheel for a band brake, operated from the bridge house by a vertical hand lever with latch handle.

The machinery is so designed that the opening of the bridge, from the moment it is closed to traffic to the moment when the leaves reach their highest position, will not take more than one minute in calm weather. To arrest the motion of the leaf at each end of its travel pneumatic buffers are provided.

When the bridge is closed the center of gravity of each leaf is on the river side of the pivot, and as the movable part of the roadway does not extend back of the pivot it is only necessary to lock the leaf against further downward movement. This is done in connection with the bridge closing buffers, by allowing the leaf to pull the lower buffer pistons against the cylinder ends, the cylinders being anchored to the masonry.

In closing, the action of the buffer is as follows: When the leaf is near the end of its closing movement a hooked lug at the lower end of the arched back of each truss picks up a 7½-inch pin, which is connected by eye bars to a combined cross head and piston and forces the latter upward in an inverted cylinder, meeting the increasing resistance of the compressing air which absorbs the energy of the closing leaf. When the air pressure has brought the leaf to rest, or nearly so, the operator opens an automatic closing relief valve connected with the three lower cylinders and allows the cross heads to come to a metal-to-metal bearing against the lower ends of the cylinders, thus forming a lock against further downward movement.

As the leaf starts to open a second lug, near the hook above mentioned, returns the buffer piston and connections, by means of a hooked lever, the vacuum being relieved by a check valve, to position in readiness for closing.

The action of the upper buffers in arresting the leaf at the end of the opening movement is similar to that of the lower buffers, the difference being that the upper buffers are operated through an intermediate lever pivoted to special pairs of stringers of the approach roadway, which stringers also support the upper buffer cylinders. The rear end of the lever acts on the piston

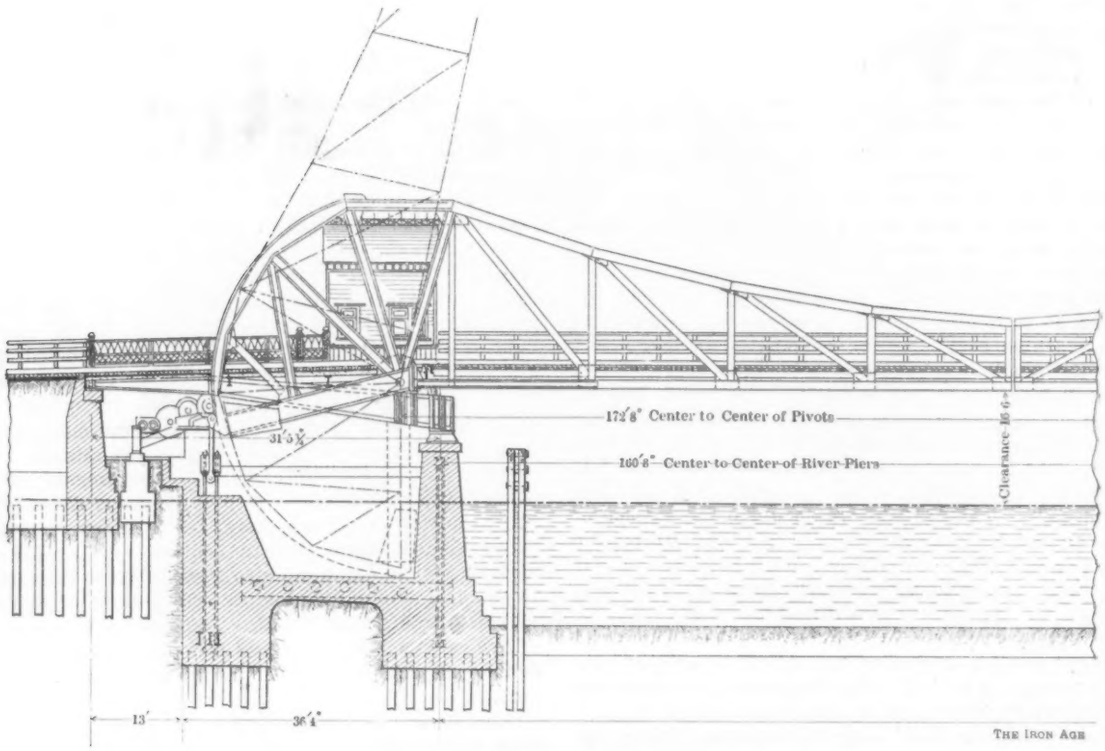


Fig. 1.—Half Side Sectional Elevation.

BASCULE BRIDGE AT WEST DIVISION STREET, CHICAGO.

through a short link. The front end of the lever is operated on in essentially the same manner as the pin of the lower buffers, by lugs located in the upper end of the arched back of each truss. The upper buffers have check valves to relieve vacuum but no valve to relieve compression.

The two leaves of the bridge when down are interlocked by means of a bolt and socket center lock at each line of trusses, strong enough to transmit one half the live load of the last panel of each leaf to the opposite leaf. The bolt sockets are capable of a limited adjustment vertically to allow for slight inequalities of level. The bolts are operated by an electric motor placed on the center truss of one leaf, and connected by reduction gears to a crank shaft, which operates a lever on a shaft connecting the three locks. The throw of the crank shaft is such that a complete revolution locks and unlocks the bolt, the bridge operator being informed

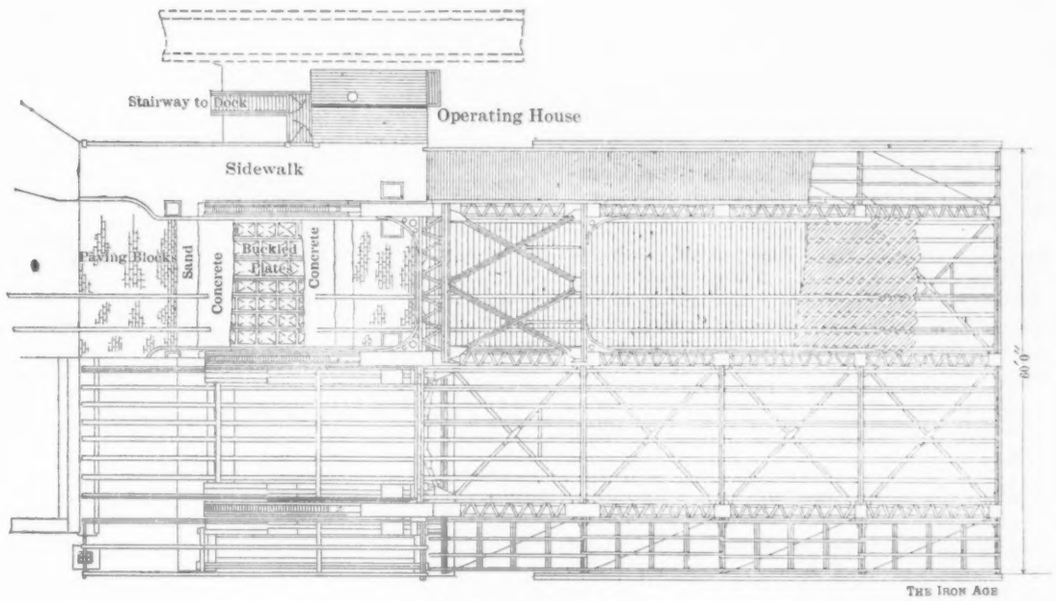


Fig. 2.—Part Sectional Plan.

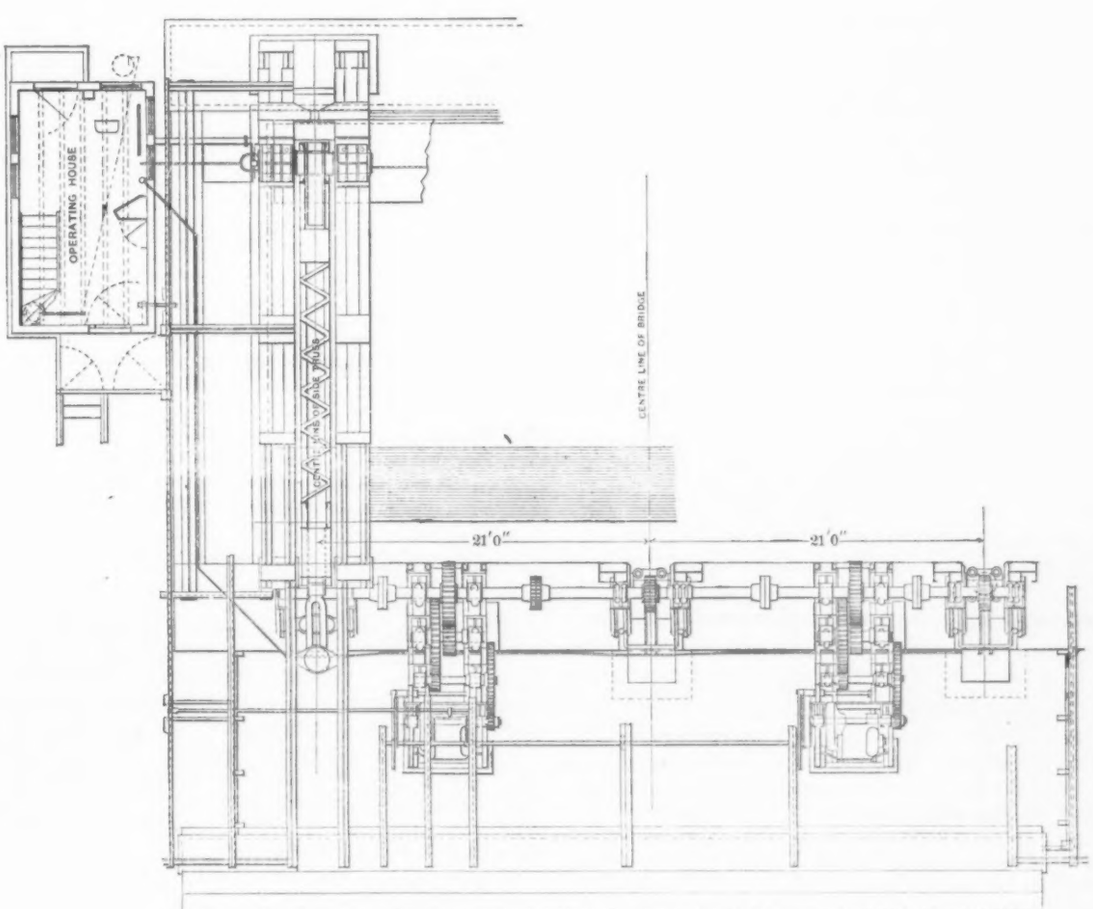


Fig. 3.—Plan Operating Mechanism.

BASCULE BRIDGE AT WEST DIVISION STREET, CHICAGO.

of the position of the bolt by means of a center lock indicator located in the operating house.

The substructure consists of two main piers and abutments, built of Portland cement concrete, reinforced by a steel framework, and two small abutments of concrete with walls of rubble masonry extending back from these latter abutments. The foundation is of piling driven to rock; top of the piles is cut off 21 feet below datum and extends 2 feet into the concrete work.

The bridge was designed by John Ericson, city engineer of Chicago.

The Production of the United States Steel Company and of Independent Concerns Compared.

The American Iron & Steel Association, with the object of clearly showing that the United States Steel Corporation does not monopolize the production of iron ore, pig iron and finished iron and steel, has prepared the following table:

Iron ore shipments and production in the calendar year 1901. —Gross tons.	By U. S. Steel Corporation.	By independent companies.	Total shipments and production.	Percentage of U. S. Steel Corporation.
Shipments of iron ore from the Lake Superior region in 1901	12,692,213	7,897,024	20,589,237	61.6
Total production of iron ore in 1901	12,692,213	16,195,266	28,887,479	43.9
Iron and steel actually produced in the calendar year 1901. —Gross tons.	**Production by plants now of U. S. Steel Corporation.**	**Production by independent companies.**	**Total production.**	**Percentage of plants now of U. S. Steel Corporation.**
Bessemer and basic pig iron	6,460,847	4,584,796	11,045,643	58.5
Spiegeleisen and ferromanganese	190,485	100,976	291,461	65.4
Forge, foundry and all other kinds of pig iron not included above	152,656	4,388,594	4,541,250	5.4
Total pig iron, including spiegeleisen and ferromanganese	6,803,988	9,074,366	15,878,354	42.9
Bessemer steel ingots and castings	6,113,588	2,599,714	8,713,302	70.2
Open hearth steel ingots and castings	2,746,996	1,909,313	4,656,309	59.0
Total Bessemer and open hearth steel ingots and castings	8,860,584	4,509,027	13,369,611	66.3
Bessemer steel rails	1,719,076	1,151,740	2,870,816	59.9
Structural shapes	629,733	383,417	1,013,150	62.2
Plates and sheets, including black plates for tinning	1,456,897	797,528	2,254,425	64.6
Wire rods	1,059,859	306,075	1,365,934	77.6
All other rolled products, including bars, skelp, cut nails, open hearth steel rails, iron rails, &c	1,324,393	3,520,609	4,845,002	27.3
Total of all rolled products	6,189,958	6,159,369	12,349,327	50.1
Wire nails, kegs of 100 pounds	6,446,938	3,356,884	9,803,822	65.8

The returns, we venture to believe, will surprise even many in the iron trade. Generally speaking they show a control of about 62 to 66 per cent. of the steel industry, the participation in the foundry pig iron trade being very small. The figures, of course, are based on the production of last year. Since then there has been a rapid expansion in the production of independent finishing mills, notably on sheets, plates, wire, tin plate and tubes, and it is doubtful whether the percentage of the United States Steel Corporation is as large to-day.

The National Association of Agricultural Implement and Vehicle Manufacturers.

The usual fall meeting of the Executive Committee of the National Association of Agricultural Implement and Vehicle Manufacturers was held at the Grand Pacific Hotel, Chicago, Tuesday, August 26. The members of the committee present were Martin Kingman, chairman; W. S. Thimas, president of the association; F. E. Meyers, H. C. Staver, W. W. Collier, C. P. Lafferty and Frank E. Lukens, secretary. There were also present James A. Carr, ex-president; Judge Vincent, association counsel, and A. J. Dean of Minneapolis, representing the Committee on Arrangements for the annual convention to be held at Minneapolis October 15 to 17 inclusive.

The most important matter considered by the committee was the proposition to create a traffic department for the association to be in charge of a traffic manager. Chairman Kingman, after reviewing the work of the various committees and calling attention to that accomplished by the committee having charge of freight classification changes, recommended the appointment of a traffic manager, and the secretary read a number of letters from members of the association upon the advisability of creating a traffic department. The agitation crystallized into the following resolution, which was adopted:

Whereas, This association has had under consideration for several years the question of the employment of a traffic manager whose duties would be to look after the classification of the various goods manufactured or sold by the different members of this association, and to assist the various members of this association in securing proper and just classification.

Resolved, That it is the sense of this association that a traffic manager be employed, provided funds can be raised to pay the expenses of same, and the Executive Committee is hereby empowered and authorized to adopt ways and means to the end of the employing of such a traffic manager.

The report of Secretary Lukens showed that the association now has 296 active and 126 associate members, a gain of 10 active and 15 associate members since the last convention. Following is a list of the new members:

Active: Bettendorf Metal Wheel Company, Springfield, Ohio; Ionia Wagon Company, Ionia, Mich.; Hoover-Prout Company, Avery, Ohio; Newell Sanders Plow Company, Chattanooga, Tenn.; Harris Machine Company, Minneapolis, Minn.; John Deere Plow Company, Kansas City, Mo.; Russell & Co., Massillon, Ohio; J. W. Dunham & Son., Berea, Ohio; Lennox Machine Company, Marshalltown, Iowa; Potato Implement Company, Traverse City, Mich.

Associate: *Orange Judd Farmer*, Chicago; *American Thresherman*, Madison, Wis.; William C. Barker Company, New York City; *Northwest Pacific Farmer*, Portland, Ore.; *St Louis Implement and Vehicle News*, St. Louis, Mo.; Illinois Engraving Company, Chicago; Alfred H. Post & Co., New York City; *Farm and Ranch*, Dallas, Texas; Chisholm & Moore Mfg. Company, Cleveland, Ohio; Osborne Mfg. Company, Cleveland, Ohio; Cleveland Punch & Shear Works Company, Cleveland, Ohio; Atlas Bolt & Screw Company, Cleveland, Ohio; W. S. Tyler Company, Cleveland, Ohio; Acme Machinery Company, Cleveland, Ohio; Forest City Paint & Varnish Company, Cleveland, Ohio.

It was reported that the treasurer now holds a balance of $2904.22.

The Entertainment Committee, through Mr. Dean of Minneapolis, presented a report of the arrangements and social functions to be carried out at the annual convention, which in general and in detail was approved by the committee. The secretary was instructed to extend invitations to attend the convention to all vehicle and agricultural tool manufacturers, not members of the association, and also to one or two representatives of each vehicle and implement dealers' association. It is contemplated to run a special train from Chicago to Minneapolis on Tuesday, October 14.

The Iron Age

New York, Thursday, September 4, 1902.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
CHARLES KIRCHHOFF, - - - - - - - - - EDITOR.
GEO. W. COPE, - - - - - - - - - - ASSOCIATE EDITOR.
RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.
JOHN S. KING, - - - - - - - - - - BUSINESS MANAGER.

Our Imports of Iron and Steel.

As foreshadowed for months in the market reports the imports of iron and steel into this country have assumed notable dimensions. During July the iron and steel products brought into this country from abroad were valued at $4,163,147, as compared with $1,958,579 in July, 1901, while the imports during the first seven months of 1902 figured up $19,334,418, as contrasted with $10,344,610 during the first seven months of 1901 and $12,992,934 during the corresponding period of 1900. The figures for seven months, however, hardly reflect the magnitude of the movement, because it did not really seriously begin until the second quarter of the current year. This is reflected in the data which the Bureau of Statistics presents for a series of articles in the matter of tonnage. In April the aggregate was 46,018 gross tons, in May it was 82,235 tons, in June it rose to 98,526 tons, and as the table printed below shows, it reached 128,551 tons in July. Developments during the past month justify the belief that the July rate will not alone be maintained for the balance of the year, but that we may witness a further increase.

Imports of Iron and Steel.—Gross Tons.

	July, 1902.	Seven months, 1901.	Seven months, 1902.
Iron and steel and manufactures of:			
Pig iron	62,156	23,980	177,763
Scrap iron and steel fit only to be manufactured	12,704	8,557	48,650
Bar iron	3,726	10,070	12,391
Bars, railway, of iron or steel, or in part steel	7,753	853	21,475
Hoop, band or scroll	290	457	2,739
Ingots, blooms, billets, &c., n.e.s.	36,080	4,489	113,264
Sheets, plate and taggers iron or steel	262	2,191	3,891
Tin plates, terne plates and taggers tin	3,103	33,690	39,669
Wire rods	2,311	9,858	11,107
Wire and articles made from	166	2,106	2,084
Totals	128,551	96,251	433,033

This table, of course, furnishes figures for only a part of the tonnage. The details relating to other branches of the trade disappear in the general figure of "all other manufactures," so that the actual tonnage is really larger. On the other hand we must take into account that a part of the goods imported are not intended for home consumption, but are re-exported under drawback arrangements. This is notably true of tin plate.

Then we consume a certain amount of foreign iron and steel at all times. This applies usually to iron bars, mostly Swedish material required for special purposes, to certain kinds of crucible steel and shapes made therefrom. Making all allowances, it looks now as though we shall import iron and steel in different forms equivalent to at least 1,000,000 tons of pig iron and scrap in excess of our usual importations, or deducting old material, an equivalent of about 900,000 tons of pig iron, to get down to the foundation of it all. In other words, our home consumption may fall off at the rate of fully 1,000,000 tons per annum before we begin to feel the pressure upon our domestic producers, or we must in one form or other produce 1,000,000 tons more of material in its equivalent of pig iron before we can stop importations, the demand continuing at the present rate. That of course looks like a safe margin for a considerable time to come, but we know that production is going to increase before the close of the year and we have only too often witnessed a sudden falling off in the requirements of the country to feel particularly comfortable with a margin apparently so great.

The Tariff Discussion in Germany.

The Germans are in the throes of a tariff revision, the imperial Government having drawn up proposals, after collecting a mass of evidence. These have been submitted to a tariff commission appointed by the Reichstag, which is overhauling and voting on every item. As we understand it the bill has a second reading before this commission and finally goes back to the Reichstag. Apparently the rates on iron and steel are reasonable and do not seem to have suffered much change thus far. What their ultimate fate will be it is of course impossible to predict.

The German press summarizes the discussion at the meetings of the tariff commission, which has a strangely familiar sound. The socialists, who are free traders, are savage in their denunciation of the industrial syndicates who are fattening on the consumer under the shelter of the tariff. They point to the fact that German manufacturers of iron and steel are selling abroad at lower prices than they charge at home and argue that ability to export goods is proof that protection is no longer needed.

We observe that every one of the defenders of the syndicates distinctly disclaims approval of many of the acts of these organizations. But after all they are represented as having had a potent influence in keeping prices down during boom periods, while the truly wicked ones were the dealers and middlemen, who squeezed the belated consumers unmercifully. No mention is made of the fact that these middlemen were put on the rack by the manufacturers when the collapse left the former with large contracts for future delivery at syndicate prices.

The selling at lower prices for export is justified by the fact that it secures work for the men and brings into the fatherland money which is distributed to all interests. The manufacturers are not doing this business for fun, but because the producers in other lands are doing the same thing. If they would only stop, the Germans, too, would be glad to give up the practice. If this rivalry keeps up the consumers in that country which does not possess manufacturing industries will be blessed—until international syndicates are formed.

An interesting feature in the situation in Germany is the attitude of the manufacturing industries to the agricultural interests. The latter are aggressive in demanding protection, and seem to have succeeded fairly well in enforcing their demands. The agriculturist party is apparently a partner who needs an occasional sharp reminder of his dependence for help upon the manufacturer.

Of course the danger of an American invasion is a frequent feature in the debate and is effective in keeping the wavering in line. It is pleasant to have a really live ghost in the closet.

The Hoover & Mason Ore Handling System.

We feel that no apology is needed for surrendering so great a part of the space in this issue to a description of the new ore handling system which has been installed at South Chicago. This is another and a very important illustration of the remarkable manner in which machin-

ery has been adapted to the requirements of manufacturing operations in this country. In no other part of the country have greater strides been made in supplanting ordinary hand labor by machinery than in the Lake district. From the development of the Lake Superior iron ore region continuous progress has been made in cheapening the transportation of ore. The long distance over which the ore must be hauled to reach the furnaces in which it is smelted has made it necessary to introduce economies at every stage. These comprise the building of enormous pockets at the shipping ports by which vessels are quickly loaded; the construction of very large steamships of special shape and arrangement, enabling cargoes of ore to be hauled at minimum cost for lake carriage, and improved appliances at the ore receiving ports. The most difficult problem to solve has been that of handling the ore from the hold of the vessel to the dock or car. Hand labor is slow, and the larger the vessel the more men have been required for this work. Our pages have from time to time presented illustrations of methods which have been devised for the more rapid unloading of ore vessels. Some of these devices have been fairly successful, and to a considerable extent they have displaced hand labor. The system introduced at South Chicago, however, appears to have taken a long stride in advance of anything heretofore accomplished. It is possible by means of the system which we illustrate this week to completely unload an ore vessel by machinery. It will be seen that this accomplishes a double measure of economy. It not only shortens the time for unloading a vessel, which enables it to make more trips during a season, but at the same time effects a decided saving in the cost per ton of unloading the ore. The other features of the system installed at South Chicago are worthy of careful study in that they show bold departures from previous methods, machinery being employed on a scale which involves the investment of a very large amount of money for the purpose of securing the most economical results in receiving and storing ore, as well as conveying it to the furnace stack. The confidence displayed by the management of the Illinois Steel Company in the success of such an untried system shows the manner in which capital in this country is prepared to make heavy investments in new devices which promise economical results. It would be extremely interesting if a statement could be given of the saving in cost accomplished by this system as against former methods, but that is one of the points in connection with works management which can hardly be expected to be made public property.

The International Harvester Company.—The general offices of the International Harvester Company have been established at 7 Monroe street, Chicago. The members of the Executive Committee are as follows: Chas. Deering, chairman; Cyrus H. McCormick, Harold F. McCormick, James Deering, James J. Glessner, W. H. Jones, Geo. W. Perkins. The statement in the daily press that the company were about to issue common stock as a bonus to stockholders is emphatically denied by Richard F. Howe, secretary and treasurer of the company. The presence of Geo. W. Perkins of J. P. Morgan & Co., chairman of the Finance Committee, in Chicago, to attend the meeting of the directors, has given rise to all sorts and kinds of rumors. It was authoritatively stated during the week that there might be something of importance to be made public, but thus far no authentic information is received.

We are advised that C. H. Halcomb, formerly of the Crucible Company of America, has not purchased property at Buffalo, or anywhere else, for the erection of a large crucible steel plant.

The Locomotive Industry.

Abstract of Census Report for 1900.

WASHINGTON, August 26, 1902.—The Census Office has completed a special report upon the production of locomotives in the United States during the census year, which has been compiled by Edward H. Sanborn. The report deals solely with the output of the works devoted exclusively to the building of locomotives as distinguished from railroad car shops, in which locomotives are constructed in connection with general rolling stock.

During the census year 1900 there were 28 establishments the sole or chief product of which was locomotives. At these works 2774 locomotives of all classes were built, with an aggregate value of $27,121,063, compared with 2409 locomotives, valued at $19,752,465, built in 19 establishments in 1890. In addition, 272 locomotives, valued at $3,276,393, were constructed at 26 railroad shops, making a total of 3046 locomotives, valued at $30,397,456, built in 54 establishments during the census year 1900. The figures for 1890 do not include locomotives built in railroad shops.

Following is a comparative summary giving the details of the industry for the census years 1890 and 1900:

	1900.	1890.
Number of establishments	28	19
Capital	$40,813,793	$24,516,574
Salaried officials, clerks, &c., number.	736	317
Salaries	$902,196	$381,654
Wage earners, average number	19,039	15,678
Total wages	$10,899,614	$8,697,488
Miscellaneous expenses	$1,369,341	$991,380
Cost of materials used	$20,174,395	$13,338,742
Value of products	$35,209,048	$24,922,756
Locomotives: Number	2,774	2,409
Value	$27,121,063	$19,752,465
Other products, value	$8,087,985	$5,170,291

It will be seen that there was a considerable increase in the value of locomotives during the ten years. The 2409 locomotives built in 1890 had an average value of $8199, while the 2774 built at locomotive works in 1900 averaged $9777 in value, an increase of $1578, or 19.2 per cent. This increase is due in part to changes in size and construction. The increase in number of locomotives built in 1900, compared with 1890, appears to have been due to the foreign demand, the number exported in 1900 being 525, compared with 161 in 1890, an increase of 364.

Geographical Location of the Industry.

The distribution of the industry by States is shown by the following figures:

Illinois.—Establishments, 4; capital, $385,000; wage earners, 86; wages, $53,543; cost of materials, $134,612; value of products, $225,300.

New York.—Establishments, 4; capital, $6,851,675; wage earners, 4394; wages, $2,660,001; cost of materials, $5,690,066; value of products, $9,492,891.

Ohio.—Establishments, 3; capital, $1,051,742; wage earners, 794; wages, $412,980; cost of materials, $812,812; value of products, $1,528,514.

Pennsylvania.—Establishments, 8; capital $20,134,539; wage earners, 9374; wages, $5,504,381; cost of materials, $9,600,875; value of products, $16,964,525.

All Other States.—(Maryland, 1; New Hampshire, 1; New Jersey, 2; North Carolina, 1; Rhode Island, 1; Virginia, 2.)—Establishments, 9; capital, $12,390,837; wage earners 4291; wages, $2,264,790; cost of materials, $3,936,030; products, $6,997,818.

These figures show that Pennsylvania led in the manufacture of locomotives in 1900, with 48.2 per cent. of the total value of products. In 1890 the State also led in value of products, with 44.6 per cent. of the total. New York was second in 1900, with 27 per cent.; New Jersey was third, but as there were only two establishments in the State its totals cannot be separately shown without revealing the details of individual operations.

The Export Trade.

American locomotives have found their way into all parts of the world, having proved their superiority over every type of foreign locomotive with which they have been brought in competition. The large export trade

is due to several causes. While the efficiency and the excellence of material and workmanship of the American locomotive are important considerations in many cases, questions of price and speedy delivery have been the determining factors. Building in large numbers locomotives with perfect interchangeability of parts, and employing labor saving machinery of the highest efficiency, American manufacturers have been able to construct engines at lower cost and in less time than any other builders in the world.

The number and value of locomotives exported from the United States during each fiscal year from 1890 to 1900, inclusive, are shown in the following table:

Year.	Number.	Value.	Year.	Number.	Value.
1890	161	$1,280,606	1896	261	$2,512,270
1891	275	2,424,363	1897	338	3,225,831
1892	197	1,717,715	1898	468	3,883,719
1893	195	1,794,709	1899	517	4,728,748
1894	142	1,028,336	1900	525	5,592,403
1895	252	2,379,519			

Method of Manufacture.

American locomotives owe much of their excellence and cheapness to the efficient machines, tools and processes used in their manufacture. The boiler is built in two sections, entirely by power riveting, practically the only rivets set by hand being those in the single ring where the halves are united. Traveling cranes handle the sheets during the process of construction and also the completed boiler, so that the use of mere human muscle is practically eliminated. Mutiple spindle drilling machines not only bore many holes simultaneously, but can also drill each hole through four or five sheets at the same operation if desired, thus securing absolute uniformity in duplicate parts, and at the same time effecting great economy in time and labor. Flanging of such parts as dome rings, furnace door flanges, tube sheets, &c., is done in one heat, at a single operation, by powerful hydraulic flanging presses. The boring and facing of cylinders are done by the same machine. In the case of a four-cylinder compound a pair of high pressure and low pressure cylinders, with their steam chest, which form one casting, are all bored at one operation, and the same machine then faces the ends of the casting. The saving in time and labor and the accuracy thus insured warrant the construction of expensive machinery especially for this work.

Instead of finishing connecting and coupling rods singly, several are clamped together and planed or milled simultaneously, with an expenditure of practically the same time and labor that would be required to finish one. Similarly and with even more marked economy, four or six frames are planed and slotted as one piece. This same principle of multiple work is applied in the manufacture of many of the minor parts of the locomotive, as well as in making fittings which are required in larger number. The light steel plates of which the tender tanks are formed are rapidly and accurately punched for riveting by machines which automatically space and punch the holes and trim the edge of the plate at the same operation.

The assembling of the finished parts and the erection of the complete locomotive are characterized by the same time and labor saving methods that are applied in the making of the component parts of the engine. Practically everything is finished and fitted, and some of the parts are even painted, before being transferred to the erecting floor, so that putting the parts together is a rapid operation. The greatest saving of both time and labor in the erecting shop is made by the use of overhead traveling cranes, powerful enough to pick up the completed engine, making it possible to lift the boiler for the purpose of placing the wheels in position after the frames and cylinders have been attached, or to move the engine during erection as much and as frequently as may be desired.

To each portion of the work of erecting the engine is allotted a separate gang of men, each having in a large establishment only one operation to perform. For example, one crew does nothing but set guides, another sets up the frames, still another attaches the cab fittings, and so on. This subdivision and specialization of the work greatly expedites the whole operation, reducing the time necessary for erecting a completed engine to a minimum that is surprising to those not familiar with the methods employed.

The time required for the construction of a completed locomotive from the raw material varies greatly, according to the requirements of the purchaser and the conditions governing the supply of materials. While ordinarily it takes several weeks, or even two or three months, to build a locomotive, some remarkable achievements in quick work have been made by American builders, either to meet emergencies or to establish records. Eight days is probably the shortest time in which an engine has been built, starting with the raw material and constructing all the parts; but an engine has been assembled and erected ready to run in 24 hours.

Special Types of Locomotives.

Locomotives driven by compressed air in place of steam have been in use for many decades, and have found increasing favor in recent years. They are confined chiefly to coal mines, where contracted space and inability to dispose of smoke and gas from steam locomotives have made compressed air particularly useful. They have also proved satisfactory in manufacturing plants where conditions do not permit the use of steam and where an electric current is not available or desirable. There has been no tendency to substitute air for steam in regular railroad service. The conditions under which compressed air locomotives are used make it necessary that they be of small dimensions, and this, together with the fact that they are not in demand for the heavy service of ordinary outdoor railroad work, has narrowed their field.

During the census year 55 compressed air locomotives, with an aggregate value of $115,802, were built by four establishments located in New York and Pennsylvania. The successful application of the principle of compounding in steam locomotives has led to the use of the same idea in locomotives driven by compressed air, and substantial advantage over the single expansion engines is claimed. For the most part, however, the compressed air locomotives have been of the single expansion type. For the operation of these locomotives air is stored in tanks, which take the place of boilers, at a pressure of from 600 to 800 pounds per square inch. In the single expansion engine the air is used at a pressure of about 100 pounds, while in the compound locomotive the pressure ranges as high as 800 pounds to the square inch.

The number of electric locomotives built during the census year was 155, and their aggregate value $288,071. Nearly all of these engines were built for use in mines, a field in which they have proved their utility and have met with much favor. A few electric locomotives of large capacity have been built for special service upon standard gauge railroads, but for the most part this service has consisted of local switching and service in the yards of large manufacturing establishments. Thus far the substitution of electric locomotives for steam propelled engines on long runs has not been undertaken.

The distinction between an electric locomotive and a railway motor car is somewhat vague and indefinite, as a motor car often performs practically all the service required of an electric locomotive, not only propelling itself, but hauling other cars. The motor has come into universal use for street, suburban and interurban railways. Its work very closely approaches that of an independent electric locomotive. This report deals, however, only with detachable locomotives, not equipped to carry passengers or freight.

A large proportion of the electric locomotives are constructed in shops which do not manufacture electrical equipment, but purchase the motors and their attachments. On this account their construction is a distinct industry, not really belonging either to the locomotive building or to the electrical equipment industry. While most electric locomotives are built for operation by current transmitted from central power plants, a few have been equipped with storage batteries, being used chiefly for light work in manufacturing establishments.

W. L. C.

Notes from Great Britain.

The Zollverein Bubble.

LONDON, August 23, 1902.—The colonial conference, to which so many interested business men looked with expectation, which was to evolve a zollverein and to form the nucleus of a great empire from which the military side was to be by no means excluded, has ended in a practical *fiasco*. I have all along foreseen this result. In an article in *The Iron Age*, March 13, 1902, entitled "The Economics of Empire," I endeavored to show by means of a series of statistical tables how impracticable was the zollverein.

The Copper Market.

The present low price of copper is occasioning a good deal of curiosity. The *Engineer* advises engineers to "make tolerably heavy purchases of copper." It proceeds: "This metal is now at a very favorable level for purchasing, and consumers, who doubtless have been watching the market fall, should not wait much longer, in case the inevitable reaction should set in. With dealings recorded at £51 10s. a ton customers have indeed an unusual chance, and the 20,000 tons visible supplies available show clearly that the metal is just now abundant." Henry R. Merton & Co. in their fortnightly statement put the price of copper at £51 5s., with visible supplies 20,306 tons, compared with 21,313 tons on July 31, when copper stood at £53. With the exception of December 31, 1901, when copper stood at £48 15s., the price has not been so low as quoted to-day for two or three years. Certainly, on the face of it, the time seems auspicious for buying. On the other hand, he would be a brave man to prophesy an increase in price just now. It is significant that whereas the visible supplies are less than they have been since January 31, yet the price is so low. Users of copper, it seems to me, are rapidly coming to the conclusion that the supplies are much richer than appears to be the case on the surface. During the last two or three years the air has been full of rumors of new copper discoveries. If only a tithe of them fulfill expectations the result must materially affect both the quantity and price of copper.

Rumor Regarding the Creusot Company.

It is stated on good authority that the Creusot Company contemplate establishing in the United States an arms and ammunition factory. A representative of the company is about to proceed to New York to make the necessary arrangements, and a site in Pennsylvania will be probably purchased. An agreement for working purposes may possibly be made with a prominent United States firm, independent of the trust, for the supply of metal.

The Metal Market.

A marked advance has taken place in the various classes of pig iron warrants on the Glasgow market, due to a circumstantial report that the New York Shipbuilding Company have given out a large order for 80,000 tons to the Lanarkshire Steel Company for manufactured iron and steel. As no information or confirmation of the report can be obtained I am inclined to think the report is a beautifully timed *canard*. A Glasgow correspondent mysteriously remarks that 8000 is nearer the mark than 80,000. None the less, Scottish warrants have this week been up to 57 shillings 6 pence, while Middlesbrough pigs have shown a sympathetic advance, 53 shillings, as compared with 52 shillings 3 pence. In the Midlands, where the market is less speculative and therefore in many respects gives a truer index to the real trade currents, work is proceeding steadily on present contracts, but little new business is seen ahead, notwithstanding the sanguine feeling in regard to the autumn still continues. Midland smelters are watching the Middlesbrough and Glasgow markets with keenness, as the obsorption of so much iron by American manufacturers will, it is thought, have a beneficial effect upon the Midland market. It may be said that at the moment supply and demand are more nearly balanced than for a long time previously. These quotations are firm without soaring too high. The railway carriage and wagon builders are fully supplied with work and are taking a good weight of material, such as carriage and wagon axles. Much of this activity is on account of South Africa. German competition has at last made its mark upon English Bessemer billets, a fall being recorded below £5, and indeed nearer £4 15s., although Welsh makers still quote a little more for special qualities for prompt delivery, obtaining from 1 shilling 3 pence to 2 shillings 6 pence a ton more. Present prices are as follows:

Pig Iron.—Forge qualities Staffordshire cinder, 50 shillings to 51 shillings; part mine, 53 shillings to 55 shillings; all mine, 57 shillings 6 pence to 67 shillings 6 pence; best all mine, 77 shillings 6 pence to 80 shillings; cold blast, 95 shillings to 100 shillings; Northamptonshire, 52 shillings to 53 shillings; Derbyshire, 52 shillings 6 pence to 53 shillings 6 pence; North Staffordshire, 53 shillings 6 pence to 54 shillings 6 pence; Lincolnshire, 56 shillings 1 penny.

Finished Iron.—Marked bars, £8 10s.; Earl of Dudley's brand, £9 2s. 6d.; second grade, £7 10s.; common unmarked bars, £6 12s. 6d. to £6 15s.; North Staffordshire bars, £6 15s.; angles, £7 10s. to £ 15s.; sheets, singles, £7 12s. 6d. to £7 17s. 6d.; doubles, £7 15s. to £8; trebles, £8 7s. 6d. to £8 12s. 6d.; galvanized corrugated sheets, f.o.b. Liverpool, £11 5s. to £11 10s.; hoop iron, £7 5s. to £7 10s.; gas strip, £7; nail rod and rivet iron, £7 5s. to £7 10s.

Steel.—Bessemer billets, £4 15s. to £5; best Siemens billets, £5 to £5 5s.; mild steel bars, £6 10s. to £7; steel plates, £6 10s. to £7 10s.; steel girders, £6 to £6 5s.; steel angles, £5 15s. to £6 5s.

The Japanese Government Steel Works.

It has been known for the last ten years that the Japanese Government have been anxious to possess a supply of iron and steel which would render them independent of foreign countries. In 1890 an attempt by the Naval Department to get a bill through the Diet for the establishment of iron and steel works for naval purposes was a failure. Later a commission was appointed to consider the matter, with instructions to report "on the amount of iron ore obtainable in Japan, the trial manufacture of pig iron and steel and the organization of the works." The commissioners sat for five years, and after a trial had been made the Government resolved to establish works and ask for an appropriation of over 4,000,000 yen ($2,000,000) to extend over four years, and to construct works able to produce 60,000 tons of steel, about half the amount required at that time. Wakamatsu, in the northwest corner of the island of Kiu-shiu, near the open ports of Moji and Shimonoseki, was the point selected. A report on these works has been prepared by Ernest Griffiths of the British Consular Service. A short synopsis of this report may serve to render clear the present position.

Two foreign experts, both Germans, are employed. The works cover about 320 acres and lie on the eastern side of a large lagoon, 10 miles in circumference, which is connected with a pool or basin 1 mile in diameter, and this, again, with the sea by a short and narrow channel. The lagoon is being deepened to 20 feet at ebb tide, and a quay over 2000 feet long is being built along the front of the works, so that a ship of 3000 tons displacement will be able to approach the quay wall. The work done up to the end of last year consisted of a channel 6000 feet long, 240 feet wide and 14 feet deep, extending from the sea to the pier of the Kiu-shiu Railway Company. The quay and all parts of the works are connected with the main line of this railway and there are about 20 miles of line about the works. The raw material is obtained in Japan, except some supplied from Hu-peh, in China. Two iron mines and three coal mines have been acquired for the use of the works, all within 20 miles of the latter and connected with them by rail.

It is estimated that when in full working order the establishment will require 250,000 tons of ore per annum, 380,000 tons of coke and 800,000 tons of coal. It is said that when all the arrangements are complete ore will be laid down in the works at a total cost of about 5 yen, or 10 shillings, per ton. A recent official announe-

ment states that the works are designed to supply the steel materials required by the Government departments at a price to be arranged yearly in advance. Certain kinds of steel will be supplied to the public, but only in large quantities to Japanese engaged in industry, and at prices lower than the imported articles. In February last the production of pig iron began and in May Siemens steel was produced at the rate of about 40 tons a day. Toward the end of June two of the five rolling mills were complete and the production of medium and small rails and plates was started. The head of the works has stated that 90,000 to 100,000 tons of steel can be produced, and that the profits will cover in a reasonable time the capital invested in this important and novel industry in Japan.

Another Furness Purchase.

The Lackenby Iron Works, Middlesbrough, have just been bought by Sir Christopher Furness. They consist of three blast furnaces, each capable of making about 600 tons of Cleveland pig iron per week. The purchase price was £20,000.

Rumored International Rail Syndicate.

Particulars are available of a scheme said to be promoted for the formation of a rail convention between the rail producers of England, Germany and Belgium. The German works interested in the question include such well-known companies as the Bochum Union, the Dortmund Union, Krupp, Phœnix, Horde, Hosch, Wendal & Co., the Rhenish Steel Works, Stumm Brothers, the Dudlingen Iron Works, Deutscher Kaiser and others, and these have formed a central export bureau, to which all inquiries for rails from abroad will be forwarded by the companies concerned. The object of the export bureau, the management of which has been intrusted to Dr. Schmide of the Krupp Works, is to endeavor on every occasion when a contract is open in the market to arrive at an understanding with the English and Belgian works in regard to the prices to be submitted for the rails required.

Big Shipbuilding Orders.

It is only a little while ago I reported that the firm of John Brown & Co. were short of naval orders. It never rains but it pours, for the Admiralty have now placed additional orders for armor plates with this firm for the cruiser "Antrim," Charles Cammell & Co. obtaining an additional order for plates for the "Argyle." John Brown & Co., in addition, have received an order from the Japanese Government for two first-class cruisers, which will be of greater displacement than those recently ordered by the British Admiralty.

Rates on German Shipbuilding Iron.

In view of recent American purchases of structural material in Germany, some information given by the Glasgow *Herald* as to rates on shipbuilding iron in Germany may prove of service. The paper in question says: "It may be of interest, in view of information lately published as to German competition in shipbuilding, and of special German railway rates to and from ports, to add the following actual charges upon shipbuilding iron from the centers where it is produced to German shipbuilding ports. The rate is not an export rate, but one intended to encourage the home industries of iron manufacture, and especially of shipbuilding. At the same time, it happens to be the same as the charge upon railway material and some other iron for shipment to the Far East. The rates are 0.27 penny per ton per mile up to 400 km. (248 miles); then 0.23 penny per ton per mile, plus 7 pence per ton forwarding charge, thus coming out among the very lowest railway rates in Europe, though some of the Levant rates are rather lower, and for fine goods are very little higher. An anomaly is that shipbuilding iron to river yards pays more than double this ton mileage charge." S. G. H.

The Machinists' Strike at Rutland, Vt.—The strike situation at Rutland, Vt., where machinists in the employ of F. R. Patch Mfg. Company and Lincoln Iron Works went out May 20 last, is substantially as follows: The two concerns affected are running with reduced forces of non-union men, and state that they have been able to fill contracts with reasonable promptness under the circumstances, and are slowly but surely obtaining their regular complement of men by hiring machinists from outside points. So far none of the strikers have been taken back, but most of them have found employment in other lines. There has been no violence or disorder, but the shops have been picketed. On August 12 the molders in the foundries connected with both shops went out and the strike still continues. The foundry of the Lincoln Iron Works is closed, but that of F. R. Patch Mfg. Company is running, and is furnishing sufficient castings to supply both shops. The manufacturers have combined to keep one foundry running, and are concentrating their efforts there.

PERSONAL.

Under the title of "A Month in Mexico," Mrs. Julia B. Thomas of Catasauqua, Pa., has reprinted for private circulation a series of charming and instructive letters written on the occasion of the trip in November last of the American Institute of Mining Engineers.

Among the recent arrivals in this country, whose object is to study American methods of iron and steel manufacture, is A. J. Hughes, grandson of the founder of the famous Hughes Works in Southern Russia, and A. S. White, manager of the plant at Hughesoffka.

William Flinn, George W. Darr and John Stevenson, Jr., all of whom are officials of the Sharon Steel Company, have gone on a trip of inspection to the ore properties of that concern in Minnesota.

Frank J. Hearne, who recently resigned his position as president of the National Tube Company, at Pittsburgh, was given a farewell banquet at the Duquesne Club in that city last week. The floral decorations were elaborate. In addition to Mr. Hearne and William B. Schiller, who succeeded him as president, other officials of the National Tube Company present at the dinner were: Taylor Alderdice, Peter Boyd, John Culbertson, A. K. Church, George G. Crawford, P. E. Crockard, H. B. Gilbert, Col. D. P. Cole, W. L. Kauffman, A. M. Lally, Vice-President W. E. Latshaw, W. N. Martin, J. H. Matheson, B. C. Moise, J. H. Nicholson, C. I. O'Connor, Charles Patterson, Peter Patterson, George N. Riley, R. C. Stiffel, A. T. Stewart, J. F. Townsend, George Trinins and Edward Worcester.

Thomas B. De Armit, who some time ago resigned the position of general superintendent of the Empire Coal Mining Company, at Bellaire, Ohio, has been made general superintendent of the coal properties of the Sharon Steel Company, at Sharon, Pa.

Henry W. Heedy, secretary and treasurer of Andrews & Hitchcock Iron Company, Youngstown, Ohio, has returned from an extended trip to Cuba.

Clarence S. Bement of Philadelphia, Pa., has returned from a European trip.

The announcement is made that Alexander C. Humphreys has definitely accepted the presidency of the Stevens Institute at Hoboken, N. J. Mr. Humphreys was graduated from the Institute, and has been for years one of the leading gas engineers of this country and of England.

Jones Hudson, who has been general superintendent of the Crum Lynne Iron Works, Pa., for several years, has severed his connection with that plant. His successor is Lewis Hampshire, formerly of Coatesville, Pa., who assumed charge September 1.

J. Howard Ewald, 83 Laclede Building, St. Louis, Mo., has been appointed sole agent for Southern Illinois, Missouri and Texas, for the Scaife and We-Fu-Go water softening and purifying systems, manufactured by Wm. B. Scaife & Sons Company, Pittsburgh, Pa. Mr. Ewald has been for years identified with the iron and steel industries in this section. He has made a special study of the subject of water purification.

Notes from Mexico.

Catalogues in Foreign Languages.

DURANGO, MEXICO, August 25, 1902.—Manufacturers who desire to cultivate trade in Spanish-American countries will pardon the suggestion that it will pay them to have their catalogues and other announcements properly translated into the native idiom. This can be done by employing only competent translators. Nothing so much detracts from a nicely printed catalogue as ungrammatical or slipshod phrases, unless it be the absurdities which so often appear when an iron clad dictionary rule has been applied to linguistic idiom in an attempt to convey meanings which are literally untranslatable. This caution is prompted by the receipt of an official catalogue issued from an Italian consulate. It is almost as humorous as one of Mark Twain's truthful stories. The translator gives evidence of incompetency at every step—at least, in the English section. It is a work of generous size, the various articles being described in four languages—viz., Italian, Spanish, French and English. Here are a few of the pearls from the English columns:

"Machinery and instruments for the Agricultura and for Provision-Industrie."

" Arms, Ammunitiour, and Its Accessories."

" Metallic Works Accessories and Buildings Furniture." Under the heading of " Hardware " comes: " Artful Works of Ordinary Metal," for the meaning of which enigma it becomes necessary to turn to the Spanish column, where it is found that the translator is more at home. What he wanted to say was: " Works of art in ordinary metal." Herbs are classified as " Herbalist Sorts; " under " Blacking " the reader finds " Warnish; " Asphalt is translated into " Aspholtum; " " Jewelry," in its English dress shines forth as " Gooldwares; " Artistic Glassware masquerades as " Cockery," and so on.

It is to be feared that the Spanish catalogues of United States manufacturers would reveal blunders equally grotesque—at least, to judge by samples of advertisements and other printed matter which have been encountered in Mexico. A handsome lithographic hanger, in colors, displaying in *fac-simile* the proclamation of the late President McKinley relative to the St. Louis Louisiana Purchase Exposition, distributed widely here, is spoiled by an obvious error in its Spanish at the very beginning of the story it starts to tell. A palpable mistake in a large Spanish advertisement in a leading United States mining journal a week or so ago might have been avoided by submitting the proof to a competent Spanish proofreader. Carefulness and precision count in selling goods as in other affairs of life.

Industrial Notes.

A coal exploiting company, with the title Compañia Carbonifera, capitalized at $1,000,000, have been organized in Monterey. The company are an auxiliary of the Monterey Iron & Steel Company, most of the shareholders in that concern being interested in it. The purpose of the coal company is to develop the coal lands situated at Musquiz, from which the works will draw a supply of fuel.

Figures are published showing the assets of the Monterey Iron & Steel Company, December 31, 1901. The chief items are:

Buildings	$1,540,031
Coal and iron mines	419,550
Lands and water rights	105,530

The total assets are given as $10,118,184.75. The approximate productive capacity of the works is:

	Tons.
Steel rails and other steel products	100,000
Ingots (iron)	12,000
Iron bars and rods	10,000
Castings	8,000
Total	130,000

Another call for $5 per share has been made upon the shareholders in the Monterey Iron & Steel Company, which makes the total $60 paid up on $100 shares.

Early in the month there was held in the City of Mexico a meeting of the shareholders of Mexico's principal operating tin mine, which bears the rather far fetched name of the Australia & Queensland Tin Mines Company. Favorable reports were made in regard to operations and prospects. It was agreed to increase the capital of the company by issuing 150 shares of stock at $100 each, for the purpose of purchasing additional machinery. The shares were immediately subscribed for by those present at the meeting. It is asserted that large bodies of tin ore have been uncovered in the company's property, and that the prospect for its profitable treatment is very favorable. The president of the company is L. La Barra, who presided at the meeting.

Five thousand tons of 70-pound steel rails have arrived from Belgium for the Mexican National Railway. These rails are the first shipment of the order for 90,000 tons placed with the Société John Cockerill of Seraing, Belgium.

A special commission representing the War Department a few days ago visited the shops of the Mexican Central Railway Company for the purpose of inspecting the various pneumatic tools and devices which the company have in operation in different departments. The pneumatic labor saving contrivances are the products of the Chicago Pneumatic Tool Company. The members of the commission, which was piloted by the tool company's local representative, were much interested in what they saw in the shops.

The California Oil Company operating near Tampico are talking of building a refinery near the wells which their representative declares have been drilled with satisfactory results. The report that the Standard Oil Company have bought the original Mexican concern out is denied.

Finds of petroleum are reported from Yucatan and Tabasco. Coal in surface veins 75 cm. in thickness has also been found in the State last named.

The demand for mining machinery, hoisting engines and boilers has been more than usually active during the present month, according to the testimony of the supply houses of the City of Mexico.

J. J. D.

The Drawback on Strip Steel.

The Treasury Department has rendered the following decision:

On the exportation of strip steel manufactured by the Sharon Steel Hoop Company of Sharon, Pa., wholly with the use of imported steel billets, a drawback will be allowed equal in amount to the duty paid on the imported material so used, less the legal deduction of 1 per cent.

The preliminary entry must show the number of bundles of 50 strips each to be exported, stated separately for bundles containing strips of the same dimensions, together with the net weight of the strips per 100 feet per bundle. Each bundle must be marked to show the length, width and gauge of the strips contained therein.

The drawback entry must show separately the number of bundles containing strips of the same dimensions, the net weight of the same and the aggregate weight of steel strips exported. The said entry must further show, in addition to the usual averments, that the merchandise covered thereby was manufactured of materials, and was packed for export shipment in the manner set forth in the manufacturers' sworn statement, dated August 1, 1902, transmitted herewith for your official information and guidance.

In liquidation, the weight of steel billets in condition as imported which may be taken as the basis for allowance for drawback may equal the aggregate weight of strip steel exported, as declared in the drawback entry, after official verification, provided that in no case shall the weight of the several dimensions for each 100 feet exceed by proportion the weights of the corresponding dimensions, per 100 feet, as indicated in the manufacturers' sworn statement hereinbefore mentioned. To the ascertained exported weight may be added 5 per cent. of the same to compensate for loss incurred in manufacture.

Scottish Steel Workers and Improved Machinery.

An important decision, says the *Engineer* of London, affecting the wages of Scottish steel workers has recently been given by Sheriff Davidson of Hamilton, who had been chosen as sole arbiter in a case raised at the instance of David Colville & Sons, Limited, Dalzell Steel Works, Motherwell. That firm, considering that the introduction of improved machinery to their works so greatly increased the earning capacity of their plate mill men as to make the wages basis of 1894 inapplicable to present conditions, and also in view of the keenness of foreign competition, applied to the West of Scotland Board of Conciliation for a revision of that basis. The board referred the matter to Sheriff Davidson as sole arbiter. To meet the possible effect of foreign competition on their products the Dalzell firm have completely renovated their works, new plant of the best modern type having been laid down at considerable expense. The more important product of the firm is still ships' plates, and in connection with this department they have now running two powerful rolling mills, which have almost trebled the capacity of their predecessors. In 1884 the average daily tonnage produced by the then existing mills was about 37 tons; in 1901 it was 81 tons in No. 1 mill, and 100 tons in No. 2. The increased output, the firm assert, has been gained entirely by the superior efficiency of the plant, and is in no way due to increased exertion on the part of the men, and that although the output has gone up—the earnings of workmen, who are paid a tonnage rate, also increasing in regular ratio—the profits have gone down; a result which the firm consider to be poor encouragement for enterprise. Their claim practically amounts to one for the readjustment of the scale of 1884, when methods now obsolete were in use, on lines more in keeping with the altered conditions of the industry. The workmen, in answer to this, adduce several arguments. They aver that the employers have already by agreement reduced the wages of the men in these mills by 5 per cent. on account of the introduction of the new machinery. They further declare that the employers gain their advantage by the increased output, and that so far as that has covered prices, they lose proportionately in accordance with the sliding scale. They also argue that although the effect of the new machinery has been to raise considerably their actual wages, such a rise is only commensurate to the increased strain, physical and mental, which the use of the improved machinery entails upon them. They further urge that their employers have directly gained by the new system in so far as they require now to employ a much smaller staff of men in the rolling mills.

Proceeding to comment on these arguments, the arbiter says: "It is quite plain that the employers gain by the increased output which the new machinery renders possible, and it is also true that the lowering of prices which has resulted from the increase of supply has affected the men's wages proportionately. It is also the case that fewer men are required in these mills. The employers, however, point out fairly enough that the advantage they derive from this is largely counterbalanced by the fact that the new method involves increased labor elsewhere—that is, outside the mills. It is fair also that some account should be taken of the fact that the workmen are now dealing with slabs of much greater weight than they were before the tire rollers were introduced, and that as the daily output is so much greater in value they have a higher responsibility. But I do not think that the workmen have proved that the strain upon them, whether physical or mental, has been materially increased. I am fully convinced that with the same amount of labor they are now earning a largely increased wage through the introduction of improved machinery by their employers. Giving the workmen all that is fairly due to them for increased responsibility, and the fact that they are dealing with material of greater value, and taking into account as well the gain to employers from increased output, and a certain saving of labor, there is still a clear balance of earnings due in no way to the workmen themselves, but to the action of the employers. The workmen, however, are entitled to some portion of that balance. Where employers and wo kmen come to a voluntary agreement, especially when a sliding scale is part of the agreement, it really means that a modified kind of profit sharing or partnership is established between them, and an arbiter is bound to consider their respective positions in that light. Therefore, I do not make the increase of output per day the measure of the reduction of wages, even after making allowance for the claims of the workmen I have already adverted to. The wages of the roller should, in my opinion, be reduced by 12½ per cent. on the present rate; those of the breaker down, chipper in and back-of-the-rolls man should be reduced by 7½ per cent.; and those of the winching-away man, sweeper and screwer by 5 per cent." The workmen, it is understood, started last week on the reduction which takes place as a result of this decision.

MANUFACTURING.

Iron and Steel.

The Clairton Steel Company of Pittsburgh, an identified interest of the Crucible Steel Company of America, and who are building 12 open hearth furnaces and three blast furnaces at Clairton, Pa., expect to start up five of their open hearth furnaces some time this month. It is possible that the starting of these furnaces may be somewhat delayed by the scarcity of Bessemer pig iron. Work is being pushed on the three blast furnaces and one stack will be ready for blast shortly after the first of the year.

Rapid work is being done on the two new blast furnaces being erected by the Carnegie Steel Company at Bessemer, Pa. These furnaces are being built by the Carnegie Steel Company themselves, and it is the intention to have them ready for blast shortly after the first of the new year. The furnaces will be similar in size to "H" and "I" of the Edgar Thomson plant, which are somewhat smaller than those at the Rankin and Duquesne plants.

The hot mills of the American Tin Plate Company that are idle are the Shenango and Greer mills at New Castle, Pa.; the La Belle, Wheeling, W. Va.; Anderson, Ind.; Gas City, Ind.; Connellsville, Va.; Elwood, Ind.; Pennsylvania Works, New Kensington, Pa.; Muskegon, Mich.; Lisbon, Ohio; Canonsburg, Pa.; Irondale, Ohio; Atlanta, Ind. The Laughlin plant at Martin's Ferry, Ohio, is in partial operation.

The Bessemer Works of the Republic Iron & Steel Company at Youngstown, Ohio, will be closed for a week or two to make necessary repairs.

The plant of the Sharon Tin Plate Company, at Sharon, Pa., which has been idle for several weeks, resumed partial operations on Tuesday, September 2. Ten of the 20 hot mills in the plant started up and the other ten will be started in a short time.

The Pittsburgh Steel Company of Pittsburgh have signed the Amalgamated scale for their hoop mill at Glassport, Pa.

The trouble at the sheet mills of the Ashland Sheet Mill Company, Incorporated, Ashland, Ky., has been satisfactorily settled to both sides, and the plant is again in operation.

We can state officially that the report that the Colonial Steel Company of Pittsburgh would build a new blast furnace adjacent to their steel works at Colonia, Pa., is untrue. However, the company have some important improvements and additions to their works under consideration, the nature of which will probably be determined upon in a short time.

The Sharon Works of the National Steel Company, at Sharon, Pa., W. J. Stoop, superintendent, are idle at present on account of the breaking of important machinery, necessitating closing down until new parts can be furnished, which will be at least from five to six weeks.

The new wire mills and cold rolling department of the Crucible Steel Company of America at the Spaulding & Jennings plant, Jersey City, N. J., which have been under way for a year or more, are approaching completion, the last of the machinery and appliances being now in process of installation. It is expected that these mills will be in operation in October. Cold drawn bars and rods, cold rolled strips and shapes and drawn wire of every description, tempered, untempered and annealed, will be produced.

Work has just begun in the Muncie (Ind.) plant of the American Sheet Steel Company on the installation of two new sets of cold rolls, which will largely increase the capacity of the mill. The concentration of all the pumps into one pump house has also been accomplished, resulting in an effective increase of power. The battery of boilers, which were a detriment by being too near the furnaces, making it impossible for the men to work in hot weather, has been dismantled. Many other general changes for the better have been made about the plant, the com-

pany having expended $25,000 in the way of improvements during the past four months.

A cinder conveying machine has been installed at Mary Furnace of the Ohio Iron & Steel Company, at Lowellville, Ohio.

The new blast furnace of the Northside Iron Company, at Sharpsville, Pa., has been blown in on Bessemer iron. The stack is a small one, being 7 x 35 feet.

The report that Rosena Furnace of the National Steel Company, at New Castle, Pa., had been shut down for three months for repairs is untrue. This stack is in blast, and unless some accident occurs will continue in operation right along.

The Cleveland Furnace Company of Cleveland have purchased another tract of 52 acres on the river front in the center of Cleveland, where their new furnaces are to be erected.

Business men of Conneaut, Ohio, are taking steps to organize a company to exploit a process invented by a steel worker named Jesse While, by which scrap steel may be converted into machinery steel.

General Machinery.

George S. Burleson, manager, the Lumberman's Tool Company, Limited, at Cedar Springs, Mich., writes us that he has been commissioned to negotiate for the necessary machinery, engine, boilers, &c., for their new plant, and that no purchases have been made as yet. The Lumberman's Tool Company, Limited, were recently incorporated with a capital stock of $50,000, and will erect a large plant at South Boardman, Mich., for the manufacture a full line of lumbermen's tools and other forgings, which they expect to have in operation by January 1. The main office is 422 Widdicomb Building, Grand Rapids, Mich. The officers are Marshall D. Elgin, chairman; F. E. Burleson, secretary; Arthur Lane, treasurer, who with George S. Burleson, manager, and E. J. Adams, compose the Board of Directors.

The H. H. Franklin Mfg. Company, producers of finished castings, of Syracuse, N. Y., have awarded contracts for the erection of a new factory, to be finished by December 10. The main building will be 52 x 110 feet and five stories high.

The R. D. Nuttall Company, Pittsburgh, manufacturers of gears and electrical railway trolleys, are constantly receiving orders from England and Germany, and also have on their books orders from France, Spain, South Africa, Belgium and Italy. The company have recently installed a large amount of machinery, which will considerably increase their capacity for the manufacture of cut gears, of which they make a specialty.

Fast progress was made in the building of the new plant of the Alliance Machine Company, Alliance, Ohio. The foundations of the building were commenced April 10 last and the steel structural work was completed on June 18. On June 24 the plant was placed in operation single turn and July 20 on double turn. The first machinery was shipped on August 11. At present about 300 men are employed. The product consists of electric traveling cranes, rolling mill and special machinery, hydraulic riveters, flangers, presses and punches.

A large car wheel plant is to be built at McKee's Rocks, Pa., by the Pennsylvania Malleable Company, Frick Building, Pittsburgh. See "Foundries."

The Waltham Auto Car Company, Waltham, Mass., recently incorporated, have taken over the plant of the Stanton Mfg. Company at Waltham and will manufacture motor cycles and automobiles.

Plans have been prepared by the Vulcan Iron Works of Seattle, Wash., for extensive additions to their plant. It is intended to install a complete outfit for the manufacture of machine bolts, rivets, &c. Isaac Hulme is president and general manager and H. P. Strickland is secretary and treasurer of the company.

The Canadian Bridge Company, Walkerville, Can., are installing a second Northern 3-motor electric traveling crane, 25 tons capacity, 60 feet span, manufactured by the Northern Engineering Works of Detroit, Mich. This crane will be used to handle heavy girders in their yard.

Braddrick & Quinlan of Montpelier, Ind., boiler manufacturers, are negotiating with Toledo, Ohio, Muncie and Marion, Ind., with a view of securing a location for their factory.

The Cleveland Worsted Mills Company, Cleveland, will erect a boiler and power house. J. N. Richardson, Cleveland, is the architect.

The Perry-Payne Company of Cleveland are to commence work at once on a power block 75 x 495 feet and four stories high, to cost $200,000. W. R. Watterson is the architect and Watterson & Grant, Cleveland, have the contract.

Boilers, Engines, &c.

The Babcock & Wilcox Company, through their Pittsburgh office in the Frick Building, A. B. Capen, manager, have recently made the following sales: 1500 horse-power, six units, to Henry W. Oliver for a central power plant in Smithfield street; to Henry W. Phipps, 3600 horse-power, in 12 units, for a central power plant in Duquesne Way; to the Allegheny Plate Glass Company, 600 horse-power, one unit for the plant at Hite Station; to the Pittsburgh Valve, Foundry & Construction Company, 300 horse-power, one unit, for the Twenty-third street works; to the Merchants' Coal Company, Boswell, Pa., 600 horse-power; to the Pittsburgh & Lake Erie Railroad Company, 1584 horse-power, six units, for the McKee's Rocks shops; the Hoster Brewing Company, Columbus, Ohio, 1818 horse-power in four units.

The addition to the plant of James Rees & Sons, boiler and engine builders, Pittsburgh, is now under roof and the installation of the machinery has been commenced. The addition is 80 x 270 feet, and adjoins the present works of this firm.

It is said that a large boiler works will be built at Sharon, Pa., by capitalists of Sharon and Pittsburgh.

The recently incorporated Lumberman's Tool Company, Limited, 422 Widdicomb Building, Grand Rapids, Mich., are in the market for engine and boilers for their new plant. Address George S. Burleson, manager, Cedar Springs, Mich.

Foundries.

The Pennsylvania Malleable Company, whose offices are in the Frick Building, Pittsburgh, have decided to build a large car wheel works adjacent to their present plant at McKee's Rocks, Pittsburgh, which will have a daily capacity of about 600 wheels. The foundry will be 120 x 300 feet, and additional buildings will contain the power plant and cupolas. Two cupolas will be installed with a melting capacity of 15 tons an hour each. The capacity of the company's malleable plant is also to be increased from 50 to 75 tons daily. An addition is being added to the main foundry building 32 x 180 feet. The melting capacity is being increased by the erection of an additional furnace. The car wheel plant will probably be completed early in December, as work on the buildings has already been commenced.

The Lane & Bodley Company of Cincinnati, Ohio, are planning a foundry, principally for their own Corliss engine business and secondarily for a jobbing foundry.

A casting weighing over 75 tons was lately poured at the foundry of the William Tod Company, Youngstown, Ohio. The casting was a bed plate for one of the two similar engines which the William Tod Company are building for the Republic Iron & Steel Company and the Youngstown Iron Sheet & Tube Company. The company are working on nine blowing engines for the Colorado Fuel & Iron Company, as well as others for shipment to Alabama and Mexico, to the American Sheet Steel Company, the American Steel & Wire Company, and others.

The Weatherby Foundry & Machine Company, Weatherby, Pa., are building an addition to their foundry, 50 x 100 feet, which is expected to increase the capacity from 500 to 800 tons per month. The company are considering the purchase of a new cupola and a 100 horse-power boiler.

The Burlington Brass Works, Burlington, Wis., have been organized with the following officers: G. C. Rusch, president; O. O. Storle, vice-president; John P. Gill, secretary and treasurer. Five acres of ground have been purchased and work will be begun at once on a foundry and machine shop.

The Deering division of the International Harvester Company are building a foundry, 80 x 830 feet, and a five-story manufacturing building, 70 x 252 feet, at their works on Fullerton avenue, Chicago. The improvements have been made necessary by the increased volume of business.

The Phœnix Iron Works, Portland, Ore., which were destroyed by fire some time since, are being rapidly rebuilt. The foundry, which is 50 x 100 feet, one story in hight, is already built and the first heat was taken off August 29. The machine shop building, which is 60 x 100 feet, two stories in hight, will be completed early in September. The entire machinery equipment will be installed as soon as the tools, which have already been shipped from the East, arrive. The pattern shop is 32 x 50 feet, two stories in hight; the wood working machinery is already on the ground. The power house is 25 x 60 feet.

The stockholders of the Beaver Dam Malleable Iron Company, Beaver Dam, Wis., held their annual meeting a few days since and elected John S. Rowell, B. F. Sherman and D. P. Lamoreux directors for the full term. The Board of Directors elected the following officers for the coming year: S. W. Lamoreux, president; Peter Beule, vice-president; E. S. Mason, secretary; D. P. Lamoreux, treasurer, and J. E. Fisher, superintendent.

Fires.

The Wingate Machine Company, York, Pa., suffered a $15,000 loss by fire at their plant August 28.

The Browning Dye Company's works, at Camden, N. J., were damaged $50,000 by fire August 27. There was a quantity of machinery in the building.

The recent fire at the foundry of John Seaton, Atchison, Kan., interfered in no way with the running of the plant, and the necessary repairs have all been made.

The plant of the Niles Mine & Mill Supply Company, Niles, Ohio, was badly damaged by fire a few days ago and 100 men are out of employment. The loss was about $25,000, partially covered by insurance. They have not decided to rebuild.

Hardware.

Robert C. Clarkson, contracting engineer, Philadelphia, Pa., has awarded the contract for the new foundry plant at Burling-

ton, N. J., for Thomas Devlin & Co. (previously mentioned in these columns), to J. S. Rogers & Co., Stanwick, N. J. Work on the operation will be started at once.

The J. M. Mast Mfg. Company of Lititz, Pa., have moved their plant from its former location, Lancaster, Pa. The present location is more advantageous, being directly on the P. & R. R. R., and is 160 x 500 feet in size. A three-story brick building, 40 x 90 feet, and a boiler house, have been erected and the manufacture of animal traps, floats, &c., has been started in the new plant.

The David Maydole Hammer Company, Norwich, N. Y., are adding to their plant by the erection of several brick buildings of heavy mill construction, and dimensions are as follows: 50 x 80 feet, 24 x 50 feet, 13 x 17 feet, 30 x 40 feet, and 34 x 120 feet. This increase in the capacity of the works became necessary in consequence of the constantly increasing demand and the present accumulation of orders for Maydole hammers. The work is being pushed rapidly forward.

The Edmonds-Metzel Mfg. Company, Chicago, in connection with their recent increase of capital stock have associated with them in the business A. R. Sheppard, who has been elected secretary and treasurer. Mr. Sheppard has been financially connected for a considerable length of time with a number of the large manufacturing interests in Chicago and has also held responsible positions with several large firms. The history of the Edmonds-Metzel Company dates back four years, during which time the business has grown to an extent necessitating the addition of this active force and compelling the erection of a building of considerable size to meet the steady progress being made. As soon as arrangements are completed for the manufacture on a larger scale of such articles as they are now making the company will probably increase their working force to 400 or 500 men.

Miscellaneous.

A meeting of the stockholders of the Sharon Coal & Limestone Company, an identified interest of the Sharon Steel Company, will be held in the office of that concern at Sharon, Pa., on November 8 for the purpose of voting for or against an increase in the capital of $100,000.

The Pittsburgh Coal Company of Pittsburgh have taken over the Milwaukee Western Fuel Company, whose capitalization is $2,000,000. The Milwaukee Western Fuel Company are an organization composed of the Urig Fuel Company, the H. M. Benjamin Coal Company and the G. B. Eastman Company. By acquiring the business of this company the Pittsburgh Coal Company will practically control the entire supply of coal of the lower lakes.

The Auto Vehicle Company, Los Angeles, Cal., are occupying a two-story brick building, 60 x 100 feet, at 943 Main street, which they have equipped for the manufacture of a full line of gasoline vehicles, with a capacity of 1000 per year. They purchased the entire equipment of machinery and tools of the Standard Iron & Brass Works of that city and a 5 horse-power Westinghouse motor for temporary use, which will be replaced by one of their own engines. The officers are F. L. Baker, president; I. B. Newton, vice-president; C. S. Hartman, secretary W. D. Longyear, treasurer, and R. B. Hain, superintendent.

On account of the rush of business, and the bright future, and to obviate the necessity of operating at night, the S. Obermayer Company of Cincinnati, Chicago and Pittsburgh, manufacturers of foundry facings, supplies and equipments, have let contracts for an additional factory building to the Cincinnati plant. The extra addition will be a three-story brick building 60 x 90 feet, and will increase the capacity of the Cincinnati plant about 33 1-3 per cent. The general offices of this company are at Cincinnati, Ohio.

The Kiehl Iron Works, Algiers, La., recently incorporated with a capital stock of $5000, have a completely equipped plant for doing all kinds of sheet iron, tin, galvanized and copper work. They will make a specialty of fuel oil tanks. The incorporators are Charles I. Kiehl, Floyd W. Morgan, and Arthur and Frank C. Duvic.

The Richmond Pattern Works, Richmond, Va., of which C. M. Liphart is the proprietor, will be extended by the addition of another floor. The product of this plant includes patterns of all kinds in wood and metal, particular attention being given to the designing and construction of stove patterns.

G. E. Montague of Springfield, Mass., will erect a plant for the building of windmills for all purposes. A gasoline engine will be installed.

The Buffalo Belting Company, a new undertaking controlled by the interests of the Buffalo Weaving Company of Buffalo, N. Y., intend building a plant. Power will be secured from the Niagara Falls Power Company, and a considerable portion of the machinery required will be built by the company. Rufus Mathewson of the Buffalo Weaving Company is interested.

A meeting of the Phœnix Galvanizing Company of Pittsburgh was held on August 31 for the purpose of reorganization and to wind up its affairs. The company will be succeeded by the Phœnix Galvanizing & Mfg. Company, which will be conducted under the present management.

At the annual meeting of the stockholders of the Pittsburgh Stove & Range Company, held in the offices of the company, Allegheny, Pa., on Monday, September 1, the following directors were elected for the ensuing year: John B. Nicholson, Charles H. Bradley, George W. J. Bissell, James F. McKee, W. S. Huntley, A. M. Neeper and John S. Graham. The board will elect officers this week.

The Portsmouth & Kentucky Fire Brick Company of Portsmouth, Ohio, have recently filled large orders for fire brick for the Dominion Iron & Steel Company, at Sydney, Nova Scotia.

The Railway Steel Spring Company purchased land a few days since near East St. Louis, Ill., where a plant will be established for the manufacture of railway springs.

The Pittsburgh Plate Glass Company have contracted with Wm. B. Scaife & Sons Company of Pittsburgh, Pa., for a 2500 horse-power We-Fu-Go water softening and purifying system, to be erected at their Elwood, Ind., plant. This system is to soften and purify well water which contains exceptionally large quantities of scale forming and corroding substances, for use in their boiler plant. Among some of the recent contracts closed by Wm. B. Scaife & Sons Company for both the Scaife and We-Fu-Go water softening and purifying systems, are the following: Union Steel Company, Donora, Pa., 500,000 gallons; Pennsylvania Salt Mfg. Company, Wyandotte, Mich., 150,000 gallons; the Ogemaw Company, North Bay City, Mich., 1500 horse-power plant; the Ogemaw Company, West Branch, Mich., 500 horse-power plant; the Lancaster Mfg. Company, Clinton, Mass., 1,000,000 gallons; the Gibson Mfg. Company, Concord, N. C., 100,000 gallons.

The General Automobile & Mfg. Company, recently incorporated with $125,000 capital stock, have succeeded the Hansen Automobile Company of Cleveland. They have just closed a deal for the lease of the factory on Hamilton street formerly occupied by the O. P. Clay Stampings Company, and will at once purchase considerable new machinery to increase their output of gasoline vehicles to six or seven per week. R. Hansen is president and E. H. Pomering secretary-treasurer.

The Amstutz-Osborn Company of Cleveland have recently incorporated with $10,000 capital stock. They are erecting a factory on Case avenue, near St. Clair street, and will make a specialty of developing new inventions. They will also engage in the manufacture of gasoline automobiles embodying several new features which they have recently worked out. In connection with this business they will manufacture a new steam generator for automobiles which will be manufactured for the Dawson Company of London, England. They are building special machinery for the American Multigraph Company, the Ferry Buttercutter Company, the American Automatic Photographer Company, the American Acrograph Company and the National Voting Machine Company.

The water works department of Lancaster, Ohio, will issue bonds to the amount of $25,000 for the purpose of building a water works station. Estimates prepared call for a collecting well to cost $21,144; building, $1851; pumping machinery, $3455; piping, $14,940, and valves and fittings, $244.

The Union Firearms Company of Toledo, Ohio, have been incorporated with $150,000 capital stock under the laws of New Jersey. The company are the result of the consolidation of the the Colton Firearms Company of Toledo, and the Spencer Repeating Firearms Company of Brooklyn, N. Y. The two plants are to be merged at Toledo and the Colton plant is to be enlarged for the purpose. George B. Colton, at present head of the Colton Company, will be president of the new company. The company will continue the lines of guns heretofore manufactured by both companies and will also take up the manufacture of a new Maxim gun. It is claimed the possible output of this line of guns has been sold for the next two years.

Mention was made in a recent issue of the fact that the Vulcanus Forging Company are desirous of removing from their present plant in Cleveland to a larger plant in some city adjacent to the Ohio metropolis. The company are now considering a proposition from the Board of Trade of Alliance, Ohio. It is proposed to erect a plant 80 x 200 for the present, this to be doubled next year. The intention is to increase the capital from $100,000 to $150,000. The company desire to build at once.

The Mellink Mfg. Company of Toledo, manufacturers of metal novelties, have increased their capital stock to $50,000 and will enlarge their factory.

The Toledo Automobile Mfg. Company of Toledo have been incorporated with $25,000 capital stock and will erect a factory for the manufacture of gasoline and steam automobiles under patents owned by George L. Lewis, now of Toledo but formerly with the Marion Steam Shovel Company, Marion, Ohio. The stockholders are prominent Toledo business men.

Charles G. Kanavel of Barberton, Ohio, is at the head of a company who will build a factory in that city to manufacture a new spring wire fence. Parties at Cuyahoga Falls and Barberton, Ohio, are interested.

The Safety Emery Wheel Company of Springfield, Ohio, are enlarging their plant and are building two new kilns, a new mixing room, new drying room and a large shop.

The Iron and Metal Trades.

So far as the business in domestic Pig Iron is concerned it has been relatively light. The principal item of interest is that the Southern railroads have advanced freights to Ohio River points 50 cents per ton, effective September 15. This applies to all sales made subsequent to September 5 and makes the new rate from Birmingham to Cincinnati $3.25.

Not alone the seaboard but to an increasing extent the interior is feeling the relief from scarcity of spot Iron brought by the importations of Foundry Iron. Consumers have been again learning to use Middlesbrough and Scotch Irons, and some of the latter are very much liked. The result has been that melters are not quite so urgent in their requests for immediate delivery of domestic Pig, many having given up begging as hopeless.

Some pretty high prices, up to $22, have been paid within the last few days for spot Bessemer Pig in the Pittsburgh district.

We note some further round sales of foreign Low Phosphorus Pig for seaboard works, and there have also been some good transactions in Steel Melting Stock.

Quite a good deal of business has again been done in foreign Bessemer and Open Hearth Billets, and we hear of a number of lots of 5000 tons, and of negotiations pending for larger quantities. Cable reports from Germany are somewhat conflicting. Some of the sellers there are asking higher prices, but all the lower figures recently ruling have not been withdrawn.

In the Central West the increased offerings of Steel works are creating an easier tendency.

Observers on the other side take the ground that the markets there depend for future strength largely upon the continuance of the recent rate of buying from here, and that any serious falling off might lead to renewed weakness.

There is little to be said concerning the heavier lines of rolling mill products. Every nerve is being strained to get out tonnage and to catch up on deliveries, and it seems probable that all the raw material available is diverted to these branches to bring about relief.

Interest in a certain way centers on the lighter lines, like Sheets, Tin Plate, Bars and Wire, because it is there that general consumption should soon be reflected by a heavier fall trade. The reports concerning Bars are getting to be rather better, and the indications seem just now to point to a taking up of slack in the Wire trade. Buyers generally in the lighter lines have assumed a conservative attitude in view of the offerings by many new mills.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one month and one year previous.

	Sept. 3, 1902.	Aug. 27, 1902.	Aug. 6, 1902.	Sept. 3, 1901.
PIG IRON:				
Foundry Pig No. 2, Standard Philadelphia	*$22.00	*$22.00	*$22.00	$14.75
Foundry Pig No. 2, Southern Cincinnati	*21.25	*20.25	*19.75	13.00
Foundry Pig No. 2, Local Chicago	*23.00	*22.00	21.00	15.00
Bessemer Pig, Pittsburgh	*21.75	*21.75	21.75	15.75
Gray Forge, Pittsburgh	*20.50	*20.75	20.50	13.50
Lake Superior Charcoal, Chicago	*26.00	*26.00	25.00	17.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	31.00	31.00	31.00	24.50
Steel Billets, Philadelphia	†27.50	28.00	28.75	27.00
Steel Billets, Chicago	†29.50	29.60	31.00	....
Wire Rods, Pittsburgh	36.00	36.00	36.00	36.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	18.50	18.50	18.50	13.00
O. Steel Rails, Philadelphia	21.50	21.50	21.50	16.50
O. Iron Rails, Chicago	24.50	24.50	24.50	20.50
O. Iron Rails, Philadelphia	24.00	24.00	24.00	18.50
O. Car Wheels, Chicago	21.00	21.00	21.00	16.50
O. Car Wheels, Philadelphia	20.00	20.00	20.00	16.50
Heavy Steel Scrap, Chicago	18.00	18.00	18.50	12.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.92	1.92	1.95	1.62½
Common Iron Bars, Chicago	1.80	1.80	1.80	1.60
Common Iron Bars, Pittsburgh	1.80	1.80	1.80	1.50
Steel Bars, Tidewater	2.00	2.00	2.00	1.62½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater	2.00	2.00	2.00	1.75
Tank Plates, Pittsburgh	1.75	1.75	1.75	1.60
Beams, Tidewater	2.10	2.25	2.00	1.75
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Angles, Tidewater	2.10	2.25	2.25	1.75
Angles, Pittsburgh	2.00	2.00	2.00	1.60
Skelp, Grooved Iron, Pittsburgh	2.10	2.12½	2.10	2.00
Skelp, Sheared Iron, Pittsburgh	...	2.15	2.15	2.05
Sheets, No. 27, Pittsburgh	2.90	2.90	2.90	3.75
Barb Wire, f.o.b. Pittsburgh	2.90	2.90	2.90	2.90
Wire Nails, f.o.b. Pittsburgh	2.05	2.05	2.05	2.30
Cut Nails, Mill	2.05	2.05	2.05	2.05
METALS:				
Copper, New York	11.30	11.50	11.75	16.50
Spelter, St. Louis	5.25	5.20	5.20	3.80
Lead, New York	4.10	4.10	4.10	4.37½
Lead, St. Louis	3.97½	3.97½	3.97½	4.27½
Tin, New York	27.05	27.80	28.60	24.45
Antimony, Hallett, New York	8.00	8.00	8.00	8.50
Nickel, New York	40.00	40.00	40.00	60.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	4.19	4.19	4.19	Nom.

* For 1903. † Foreign.

Chicago

FISHER BUILDING, September 3, 1902.—(*By Telegraph.*)

Pig Iron.—Aside from the advance in freight rates scarcely a new feature of importance or one worthy of special comment has been developed in the market for Pig Iron during the week. The difficulty of obtaining ample supplies of Coke of desirable quality has been without relief, and the troubles of the furnaces and foundries have been aggravated correspondingly. The poor deliveries of Iron following in the train of the fuel scarcity are sending more buyers into the market for Pig for quick delivery, and it seems to be a more serious question from day to day where ample supplies of domestic Iron are to be secured. Some little foreign Iron is still finding its way into this territory from the East, but direct importations have been inappreciable. Should there be no relief from present conditions within a very short time it seems to be probable that foreign Pig will follow the course of foreign Steel into the Central West by way of Canada or the Gulf of Mexico, more advantageous shipments being made in this way than through the Eastern seaboard. The major portion of the demand for prompt delivery of domestic Iron is for Softeners and Silicon for melting Scrap, and with a growing scarcity of Pig, Scrap comes more and more into favor. But the difficulty of obtaining the latter is almost as serious as the outlook for an ample ready supply of Pig Iron. The largest individual sale of Iron which has come to the surface during the week is about 1000 tons of Basic at about $26, delivered. Local Coke No. 1 Foundry for prompt shipment commands $25 to $26, but sales have been made for the second quarter of next year at $23, at the furnace. The little Silicon Iron offered has been readily sold at $30 to $32 spot and single

cars of No. 1 Southern Coke have been sold at $27.65, No. 2 at $27.15 and No. 3 at $26.65, Chicago. It is announced that freight rates from Southern furnaces to the Ohio River have been advanced 50c. per ton, to take effect September 15, and all contracts made after September 5 will take the new rate. There are very few Southern furnaces that will contract for the first half of next year or for the second quarter under $19 for No. 1, $18.50 for No. 2 and $18 for No. 3, Birmingham basis. To conform to the higher views of both Northern and Southern stacks and in conformity with the advance on freight from the South as indicated above prices are revised as follows, being for the first half of 1903:

Lake Superior Charcoal	$26.00 to $27.00
Local Coke Foundry, No. 1	23.50 to 24.00
Local Coke Foundry, No. 2	23.00 to 23.50
Local Coke Foundry, No. 3	22.50 to 23.00
Local Scotch, No. 1	24.00 to 24.50
Ohio Strong Softeners, No. 1	25.50 to 26.50
Southern Silvery, according to Silicon	23.10 to 23.50
Southern Coke, No. 1	23.15 to 23.65
Southern Coke, No. 2	22.15 to 22.65
Southern Coke, No. 3	21.15 to 21.65
Southern Coke, No. 1 Soft	23.15 to 23.65
Southern Coke, No. 2 Soft	22.65 to 23.15
Foundry Forge	21.65 to 22.15
Southern Gray Forge	20.05 to 21.15
Southern Mottled	20.65 to 21.15
Southern Charcoal Softeners, according to Silicon	27.15 to 27.65
Alabama and Georgia Car Wheel	27.00 to 27.50
Malleable Bessemer	24.00 to 25.00
Standard Bessemer	25.00 to 26.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	27.60 to 28.60

Bars.—The market for Bar Iron is hardening with an improved demand. The volume of business has not been large, however, although there have been several contracts ranging from 1000 to 3000 tons placed during the past ten days at prices ranging from 1.85c. to 1.95c., Chicago. There is an improved demand for Soft Steel Bars and the market continues firm. The following are the prices current: Bar Iron, 1.80c. to 1.85c.; Soft Steel Bars, 1.75c. to 1.90c.; Hoops, 2.10c. to 2.25c.; Angles, 1.85c. to 1.95c., base, mill shipment. The demand from store has been active for Bars and Angles, but there has been little call for Hoops. Prices are as follows: Bar Iron sells at 2.25c., Soft Steel Bars at 2c. to 2.25c., Angles at 2.50c. and Hoops at 2.50c.

Structural Material.—While there has been less trading in Shapes of all kinds, the falling off in new business is but temporary and specifying on old contracts has been very active, the mills being so far sold ahead as to discourage rather than solicit new business. There is still some inquiry for foreign Shapes, but none have crystallized into business during the week. Domestic Steel, mill shipment, sells at the following prices: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c. The demand from store has been active, with the following prices readily obtained: Beams and Channels from local yards are quotable at 2.50c. to 3.50c., Angles at 2.50c. to 3.50c., Tees at 2.55c. to 3.50c., but premiums are often paid over these prices for special sizes wanted immediately.

Plates.—While there are but few large individual orders the aggregate volume of business keeps order books well filled, and the market continues strong as follows: Tank Steel, ¼-inch and heavier, 1.75c. to 2.25c.; Flange, 1.85c. to 2.35c.; Marine, 1.95c. to 2.50c. The demand from store is active and the market strong at the following prices: Tank Steel, ¼-inch and heavier, 2.30c. to 2.50c.; Tank Steel, No. 8, 2.45c. to 2.55c.; Flange, 2.40c. to 2.75c., all f.o.b. warehouse, Chicago.

Sheets.—Galvanized Sheets are freely offered and easy, liberal discounts being granted to the local trade. The official prices from mill, however, are without essential change. In Heavy Sheets the demand is good, and even Light Sheets continue to meet with more favor. Quotations are as follows: No. 27 Black Sheets, 3.25c., mill shipment; from Chicago, small lots from store, 3.45c. to 3.55c. Mill shipment Galvanized Sheets sell at 4.05c. to 4.15c., net, and small lots from store are sold at 4.55c. to 4.65c. for No. 27.

Cast Pipe.—There has been a fair run of moderate sized orders from railways, gas and water companies throughout the country, mainly for Pipe ranging from 4 to 8 inches, but no large municipal contracts have been closed. One thousand tons of 30's has been taken, however, for shipment to Denver, Col. Prices remain firm, manufacturers quoting for small lots on the open market as follows: 4-inch, $35.75 to $36; 6-inch, $33.75 to $34; 8-inch and upward, $33. Gas Pipe, $1 per ton higher than Water, f.o.b. Chicago.

Merchant Pipe.—There has been some little improvement in the demand, but with active competition the market has been barely steady. Official prices, however, are without change, random lengths, Chicago, selling as follows: Black, ⅜ to ½ inch, 56½ off; ¾ to 12 inches, 63½ off; Galvanized, ⅛ to ½ inch, 43½ off; ¾ to 12 inches, 50½ off.

Boiler Tubes.—A steady market and a fair volume of business has been the record of the week, prices for mill shipment being as follows:

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 inches and larger	55½	38

A fair order demand from store has been experienced, with a firm tone prevailing and prices as follows:

1 to 1½ inches	35	35
1¾ to 2½ inches	47½	32½
2¾ to 5 inches	55	42½
6 inches and larger	47½	..

Merchant Steel.—A fair volume of business has been transacted in Spring, Tool and Agricultural Steel, the demand increasing rather than otherwise, and most of the producers securing fair contracts. Store trade is quite active. Prices for mill shipment are as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 50 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 7c. for mill shipments; specials, 12c. upward.

Rails and Track Supplies.—Inquiries for round amounts of Steel Rails aggregating over 100,000 tons have been received, but because of the late deliveries only which can be made the belated railways are obliged to place contracts with Eastern mills. The only sale of moment which is reported to have been consummated is that of 25,000 tons to the Santa Fé Railway. Local mills are sold up to December 1 on Spikes, and up to the first of the year on Light Rails. Official quotations continue unchanged at $28 for Standard and $27 for second quality at the mill. Light Sections are wanted at $32 to $45, according to weight and time of delivery. Track supplies of all kinds are readily disposed of at the following prices: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Billets.—But few large contracts either of domestic or foreign Billets have been reported, and local prices have varied very little, although in sympathy with higher prices reported abroad the market presents a little better tone. Small lots of domestic Open Hearth Forging Billets are selling at $35 to $40, according to analysis, buyer and time of delivery, but where round lots are obtainable lower prices would have to be accepted. Small lots of foreign Billets have been sold at about $29.50 to $30, Chicago.

Old Material.—While there have been more ample offerings of heavy material the demand has been sufficient to absorb the supply, and the market has continued firm, with prices tending upward on some of the lighter material. There continues to be a good demand for Old Steel Rails, with dealers' buying prices of Relaying Rails in the neighborhood of $30 and $30.50, Chicago. The following are prices current per gross ton:

Old Iron Rails	$24.50 to $25.00
Old Steel Rails, mixed lengths	18.50 to 19.00
Old Steel Rails, long lengths	23.50 to 24.50
Heavy Relaying Rails	30.50 to 31.50
Old Car Wheels	21.00 to 22.00
Heavy Melting Steel Scrap	18.00 to 18.50
Mixed Steel	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates	$22.50 to $22.75
Iron Car Axles	25.00 to 26.00
Steel Car Axles	23.00 to 23.50
No. 1 Railroad Wrought	21.00 to 21.50
No. 2 Railroad Wrought	18.50 to 19.00
Shafting	19.00 to 20.00
No. 1 Dealers' Forge	17.00 to 18.00
No. 1 Busheling and Wrought Pipe	15.00 to 15.50
Iron Axle Turnings	14.50 to 15.00
Soft Steel Axle Turnings	14.50 to 14.75
Machine Shop Turnings	14.00 to 14.25
Cast Borings	10.25 to 10.75
Mixed Borings, &c	10.25 to 10.75
No. 1 Boilers, cut	14.50 to 15.00
Heavy Cast Scrap	16.50 to 17.00
Stove Plate and Light Cast Scrap	12.00 to 12.50
Railroad Malleable	16.25 to 16.75
Agricultural Malleable	15.00 to 15.50

Metals.—Copper has continued quiet and easy, with Lake quotable at 12c. in car lots and 12¼c. to 12½c. in a jobbing way. Pig Lead has continued firm, with a good demand at 4.05c. tor 50-ton lots and 4.07½c. in carload lots. Sheet Zinc has been in good demand and firm at 6½c. in carload lots and 6.65c. in lots of 600 lbs. Old Metals have been in fair demand, but lower prices have prevailed for Brass and Copper Bottoms, while Lead and Zinc have continued firm. The following are the prices current: Heavy Cut Copper, 10¾c.; Red Brass, 10½c.; Copper Bottoms, 9½c.; Lead Pipe, 3.80c.; Zinc, 3.65c.

Coke.—The supply of Coke has continued inadequate, both furnaces and foundries being in danger of banking almost daily. The little Coke that has arrived has sold readily at $8 to $8.50 per ton for either Connellsville 72-hour Foundry Coke or West Virginia Coke, on track Chicago. In exceptional instances $10 to $12 per ton has been offered, the latter price for special kinds.

T. S. Casey, Marquette Building, Chicago, has been appointed agent for the sale of Pipe, Sheets and Plates manufactured by the Wheeling Steel & Iron Company, Wheeling,

W. Va., covering the States of Illinois, Indiana, Wisconsin, Minnesota, Iowa, Nebraska, Kansas and Colorado.

Philadelphia.

FORREST BUILDING, September 2, 1902.

The Iron and Steel markets are in such a peculiar condition that it is almost impossible to size them up with any great degree of confidence. The conditions are so contradictory and the influences so diverse that the final outcome cannot be estimated at the present time. It is true that in the main the business outlook is magnificent, and with such crops as are now assured it seems hardly possible that anything unfavorable will be developed. But there are certain inequalities and disproportions that must necessarily be straightened out before smooth sailing can be expected. These matters have been discussed in previous reports, however, so that a repetition is uncalled for, but they are in force to-day just as much as they were a month ago, and sooner or later they will have to be dealt with. Coal and Coke will have to get back to normal quotations before there can be any large increase in the production of Pig Iron, and in the meanwhile Europe is giving us about all that we can use. Indications warrant the assumption that the country's requirements will be larger than ever before, but against that is the fact that new plants and extensions will in the near future make us entirely independent of foreign supplies, which will be very likely to precipitate serious consequences abroad. Trade conditions in Europe are notoriously bad, and the closing of their chief outlet for Iron would be pretty certain to give them a great deal of trouble. Prices on this side are high enough to enable our producing interests to meet a heavy decline in foreign markets, but it cannot be done on the present basis of costs. Trouble along these lines is not likely to develop very rapidly, however; stocks are too light for that, and transportation facilities are too inadequate to permit full advantage to be taken of the increased capacity for production. But it is merely a question of time; it may be realized in six months; it may be a year or even beyond that time, but whatever the date, it will have to be met some time. A little foretaste of it has already materialized in the Tin Plate and Sheet trades, and in the course of time other lines will be confronted with the same difficulties. High prices, therefore, cannot be maintained for any lengthened period, and even now they are not strictly legitimate. With the ordinary supplies of fuel there would have been no such scarcity of Iron as there is to-day, so that with a return to normal conditions lower prices are as certain as can be, although it will require time to bring it about. While the general conditions in this country are of the most hopeful and substantial character, it is certain that adverse conditions in Europe will be more or less detrimental to this country, so that it is advisable to keep a watchful eye beyond our own borders. It is unfortunate that the close of the war in South Africa is not bringing the revival of business that was expected. The event appears to have been fully discounted. Large quantities of goods were sent out months before the end was reached; and for various reasons the distribution is disappointingly slow, so that additional shipments are not called for as was expected. Moreover, the discharge of men from the army is overloading the labor market, and the number of unemployed men is likely to cause much distress during the coming winter. On the Continent the business situation is extremely bad, the American demand having been about the only bright spot for several months past. Close students of the situation concede splendid prospects in our own country, but after personal visits and investigations have serious misgivings in regard to European matters, and on that account they are not sanguine in regard to the permanency of high prices in the American markets.

Pig Iron.—The immediate conditions in Pig Iron appear to be somewhat easier, due mainly to the liberal arrivals from abroad. Consumers have about given up trying to get American Iron, and are decidedly less anxious about it since they have found good substitutes in the foreign article. Some of the Scotch brands are giving great satisfaction, and as they can be delivered promptly the feeling is very much easier. Most of the recent sales for early deliveries have been Scotch or English Irons, and to some extent this has checked the demand for next year's deliveries of American Iron, although at the figures of last week some business has been done. There is no doubt that the situation has been greatly relieved by recent developments, and the American furnaces will now have a chance to begin making deliveries on back orders. Be that as it may, buyers are not running around begging for Iron, since they have found that they can get what they want from other sources more promptly and on easier terms than they would have to pay for their regular brands. In other respects, and as regards prices, the market is just about as it was a week ago, and from present appearances it is not likely that there will be any change of importance in the immediate future. Prices abroad are a little stiffer, but this is offset by lower freights, so that sales are made at about the same prices as before. Cargo lots c.i.f. at about $19 for Middlesbro No. 3, small lots, $20 to $20.50 alongside, or delivered in buyers' yards $21 to $21.50. Scotch Iron ranges from $22.50 to $23.50, and American at about the same figures as quoted in our last, for city or nearby deliveries during the first half of next year, as follows:

No. 1 X Foundry		$23.50 to $24.50
No. 2 X Foundry		22.00 to 22.50
No. 2 Plain		21.00 to 22.00
Standard Gray Forge		20.50 to 21.00
Basic		20.50 to 21.00
Low Phosphorus	Prompt shipments or spot.	23.00 to 23.50
No. 3 Middlesbro		21.00 to 21.50
Scotch Irons		23.00 to 24.00

Billets.—Business is confined mostly to German and English Steel, in which a good many lots have been taken during the past week and other large lots are under negotiation. Prices vary all the way from $27.50 to $30, according to specifications, ordinary sizes being available at the inside figure.

Plates.—There are no new features in the Plate trade. The demand is good and full employment appears to be the rule, but there is no particular rush of new business. Prospects are good, however, and prices are steady as last quoted, viz.: Small lots, 2.10c. to 2.15c.; carload lots, ¼-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c.; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C. H. No. 1, 2½c.; C. H. No. 1 Flange, 3c.; C. H. No. 1 Flange Fire Box, 3½c.

Structural Material.—The demand is good and sales are numerous, although the lots are not specially large. The arrivals from abroad and the prospect of important additions to the productive capacity have developed an easier feeling, as deliveries are now made with a fair degree of promptness. The Pottsville plant is expected to be in operation next month, and seaboard deliveries will no doubt be more satisfactory than they were earlier in the year. Prices for prompt deliveries are from 2.10c. to 2.25c. for Beams, Channels and Angles; subject to delay in deliveries they are quoted from 1.75c. to 1.90c.

Bars.—The situation in the Bar Iron trade is satisfactory, and some of the mills report having all the business they can handle. Others are open for business, and from the fact that bids of 1.92c. are not turned down it is inferred that the market is not quite as strong as it recently was. However, 1.92c. is the bottom quotation for carload lots, and from that to about 1.97½c. covers the entire ground. Steel Bars are quoted from the West at 1.72c., but no guarantee as to date for delivery, local mills quoting 2c. to 2.10c. for September shipments.

Sheets.—The demand is very slow, and on first-class business prices are easier. Ordinarily, however, quotations are about as follows for Best Sheets (Common one-tenth to two-tenths less): Nos. 10 and 12, 2.30c. to 2.40c.; No. 14, 2.50c.; Nos. 16 and 17, 2.70c.; Nos. 18-21, 3c.; Nos. 26, 27, 3.10c.; No. 28, 3.30c.

Old Material.—The demand is improving, and prices are a shade firmer than they were a week ago, but not quotably higher. Bids and offers for deliveries in buyers' yards are about as follows:

Old Steel Rails	$21.50 to $22.00
Heavy Steel Scrap	20.50 to 21.00
Low Phosphorus Scrap	27.50 to 29.00
Old Steel Axles	26.00 to 27.00
Old Iron Rails	24.00 to 25.00
Old Iron Axles	29.00 to 30.00
Old Car Wheels	20.00 to 21.00
Choice Scrap, R. R. No. 1 Wrought	23.00 to 24.00
Country Scrap	19.00 to 20.00
Machinery Cast	19.00 to 20.00
No. 2 Light Scrap	17.00 to 18.00
No. 2 Light Scrap (Ordinary)	15.00 to 16.00
Wrought Turnings	16.00 to 17.00
Wrought Turnings, Choice Heavy	18.00 to 18.50
Cast Borings	10.00 to 10.50

E. B. Leaf & Co., Real Estate Trust Building, Philadelphia, Pa., have purchased the Spring City Bloom Works, Spring City, Pa., and will operate the plant under the same name, manufacturing Knobbled Hammered Charcoal Blooms. They have also been appointed sales agents for the Bar Iron made by the Logan Iron & Steel Company, Burnham, Pa., and T. F. Patterson, formerly manager of the Montour department of the Reading Iron Company, will have charge of this branch of their business.

J. Max Bernard, late of the firm of C. B. Houston & Co., has commenced business on his own account and will have offices in the Real Estate Trust Building, Broad and Chestnut streets, Philadelphia, Pa.

George L. L. Davis, formerly connected with Roach's Shipyard, Chester, Pa., and St. George Bryan of Richmond, Va., a son of President James Bryan of the Richmond Locomotive Works, have associated themselves in business as dealers in Railroad and Shipbuilding Supplies, with headquarters in the Arcade Building, Philadelphia.

Cincinnati.

FIFTH AND MAIN STS., September 3, 1902.—(*By Telegraph.*)

Except for odds and ends of Irons, which are commonly known as outside, there has been but little business transacted the past week. It has been the quiet period, both in buying and selling circles; a general disposition on the part of buyers to rest and see what the future has in store and on the part of furnaces to await the rules of production. At present the buyers are considerably hampered for lack of deliveries, and the furnaces are in a close position on account of the scarcity of Coke and other troubles which do not seem to yield much as time passes. The general range of prices may be said to be unchanged, both for this year's and next year's delivery. Spot Iron is still as scarce as it has been, and the range of prices governed by the conditions of each sale. A sale of a few carloads of No. 2 Southern Foundry was reported on the basis of $21.25, Birmingham; others quote small offerings at higher prices. The most important announcement during the week is the fact that on September 15 the railroads will advance Southern freight rates 50c. to Ohio River points. The understanding is that all sales made and recorded before September 5 take the old rate of $2.75, and all sales after that date the new rate of $3.25. Freight rate from Hanging Rock district is $1.10 and from Birmingham $2.75. We quote, f.o.b. Cincinnati, for 1902 delivery, as follows:

Southern Coke, No. 1	$24.50 to $26.25
Southern Coke, No. 2	24.00 to 25.75
Southern Coke, No. 3	22.75 to 24.50
Southern Coke, No. 4	22.25 to 22.50
Southern Coke, No. 1 Soft	24.50 to 26.25
Southern Coke, No. 2 Soft	24.00 to 25.75
Southern Coke, Gray Forge	20.25 to 20.75
Southern Coke, Mottled	20.25 to 20.75
Ohio Silvery, No. 1	26.10 to 26.60
Ohio Silvery, No. 2	25.85 to 26.10
Lake Superior Coke, No. 1	26.10 to 26.60
Lake Superior Coke, No. 2	25.60 to 26.10
Lake Superior Coke, No. 3	25.10 to 25.60
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel, chilling grades	$26.75 to $27.75
Lake Superior Car Wheel and Malleable	25.00 to 26.25

Quotations for first six months of 1903, f.o.b. Cincinnati, the buyer to assume freight difference which may exist at time of shipment, are as follows:

Southern Coke, No. 1	$21.75 to $22.25
Southern Coke, No. 2	21.25 to 21.75
Southern Coke, No. 3	20.75 to 21.25
Southern Coke, No. 4	20.25 to 20.75
Southern Coke, Gray Forge	20.25 to 20.75
Southern Coke, Mottled	20.25 to 20.75
Southern Coke, No. 1 Soft	21.75 to 22.25
Southern Coke, No. 2 Soft	21.25 to 21.75
Lake Superior Coke, No. 1	24.10 to 24.60
Lake Superior Coke, No. 2	23.60 to 24.10

Old Material.—The market is quite strong and a good active demand for Cast Scrap, which is proportionately the strongest point of the list. We quote dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, $20.75 to $21 per net ton; Cast Scrap, $16 to $16.50 per gross ton; Iron Rails, $24 to $24.50, gross; Steel Rails, long, $24 to $24.50, gross; Steel Rails, short, $18.50 to $19, gross; Iron Axles, $27.75 to $28.25, net; Car Wheels, $20.75 to $21, gross.

Iron Bars.—There is not much change in the general situation, and a fairly good volume of business for the season is being transacted. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.92c., with half extras. Less than carload lots, 2.02c., with full extras.

St. Louis.

CHEMICAL BUILDING, September 3, 1902.—(*By Telegraph.*)

Pig Iron.—Very little if any change in the Pig Iron conditions have shown in this market for the past week. Demand and inquiry for near and far off delivery is moderate in volume and prices are very steady. Carload business is being executed on a limited scale and offerings command a wide range of premiums, depending altogether on the degree of urgency of the buyer. An advance in freight rates of 50c. per ton from Southern furnaces is announced to take effect September 15. The following is the range of prices current for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry	$21.50 to $24.00
Southern, No. 2 Foundry	20.75 to 23.25
Southern, No. 3 Foundry	20.25 to 22.75
Southern, No. 4 Foundry	19.75 to 22.25
No. 1 Soft	21.25 to 23.75
No. 2 Soft	20.75 to 23.25
Gray Forge	19.75 to 21.75
Southern Car Wheel Iron	19.75 to 22.25
Malleable Bessemer	.... to ....
Ohio Silvery, 8 per cent. Silicon	.... to ....
Ohio Strong Softeners, No. 1	.... to ....
Ohio Strong Softeners, No. 2	.... to ....

Bars.—Trade in the jobbing district for Iron and Steel Bars is along moderate lines, but the jobbers say that a steady improvement continues to manifest itself. The price-list shows no change. We quote from the mills: Iron Bars at 1.90c. to 1.95c. and Steel Bars at 1.90c. to 2c. Jobbers quote Iron Bars at 2.25c. and Steel Bars at 2.25c.

Rails and Track Supplies.—In this department we can note no new features affecting the conditions of demand and prices. We quote as follows: Splice Bars at 2.10c. to 2.15c.; Bolts, Square Nuts, 3c. to 3.10c.; with Hexagon Nuts, 3.25c. to 3.30c.; Spikes, 2.50c. to 2.60c.

Angles and Channels.—The demand for Small Angles and Channels from the jobbers shows improvement and new outside inquiry is more liberal. For material of this class 2.50c., base, is the quotation.

Pig Lead.—The situation in the Pig Lead market is bare of new features and the volume of demand and inquiry shows no increase. Chemical at 4c. and Desilverized at 4.05c.

Spelter.—Transactions in the Spelter market are in moderately large volume, and 5.20c. is the price asked at this time.

Cleveland.

CLEVELAND, OHIO, September 2, 1902.

Iron Ore.—The movement of Iron Ore is now being impeded by one of the most serious car shortages that has ever been witnessed in this territory. At one time during the week just closed every port was blocked for the lack of motive power with which to move the cars loaded. The tying up of boats at the lower lakes has inclined the vessel owners to ask more money for transporting a cargo upon which there is so much delay.

Pig Iron.—This has been rather a quiet week. Buyers seem to have lost hope of getting any material for this year's delivery, and most of them have pretty nearly covered their needs for the first half of next year. Production has been very greatly reduced. Most of the merchant furnaces are now out of blast. The furnaces belonging to the United States Steel Corporation seem to be almost immune from the Coke shortage and are running full. The car shortage is blamed on all sides for the condition of affairs. Coke producers have announced that their production is now greater than it has ever been, and that they could supply the furnace needs were there motive power and cars enough to meet the demands. It is well known that former suspensions of activity had caused the delivery of some of the material ordered for this year to be deferred until after the first of next year. The present suspension of activity, which will take most of the merchant furnaces here out of the market for at least two weeks, will still further complicate the situation and increase the amount to be carried over into next year. The worst of it is that many of the producers predict that the present situation is indicative of what may be expected until after the close of the season of navigation. The conditions are of necessity having a certain effect upon prices. The future price of Foundry Iron is rapidly creeping upon the almost abnormal prices demanded for this year's delivery. For spot shipment of No. 2 Foundry $25 is the minimum, and it is evident that none of this grade for future delivery is obtainable at less than $22 a ton, Valley furnace. The prospect of a serious shortage of Iron during the first half of next year is causing the upward tendency in prices. The Basic producers have about withdrawn from the market for the first half of next year, and any material for immediate shipment is entirely out of the question. The producers are not quoting any prices unless there is a choice order to bid for. The Bessemer Association is still silent as to the prices at which material is to be sold for the second quarter of next year, but it is evident that the lessening of the supply now is having a certain effect upon the prices for that period. No Iron is being sold for this year's delivery.

Finished Iron and Steel.—There has been another advance in the price of Plates for spot delivery, made this time by the smaller mills. Some of them seem to have small amounts to sell, but it is claimed that this is being withheld from those who have contracts at a much lower price than is now being obtained. The contracts were taken on the basis of 1.60c., Pittsburgh, and as the present price is 2.50c. at the mill, the premium has proved too much of an inducement for the producers. The selling for the first half of next year continues, and it is now understood that most of the output, if not all of it, for first half delivery on the part of the big mills has been completely sold up. The smaller mills are beginning to sell small amounts of Plate at a premium for next year, but the consumers are slow in covering at the advanced prices, hoping to be able to get in their orders with the mills which are adhering to the association price. Most of the consumers have covered their needs. The Sheet trade is a little quiet. The fall buying has not started in and the consumers seem to be holding off for some reason. Black Sheets are in fair demand at 3.10c. to 3.20c. for No. 27 as a base at the mills and 3.35c. to 3.50c. out of stock. On Galvanized Sheets the mills are quoting, delivered at Cleveland, 4.50c. for No. 27 as a base. This is one of the weak spots of the market. The demand for Bars has been more brisk during the week and some business has been

done on the old prices for the Steel product, 1.60c., Pittsburgh, being asked for Bessemer and 1.70c., Pittsburgh, for Open Hearth. Most of the capacity has been sold up for this year, and a few orders have been taken entailing delivery into the first quarter of next year, but this business has not been very heavy. The market, however, is firm and active. In the Bar Iron trade there are fewer signs of weakness than hitherto. The mills are all back in service again and are producing rapidly. While there are reports of a shading of the agreed price in order to obtain business it cannot be definitely stated that there have been transactions on any other basis than 1.80c., Pittsburgh. There is still an interest in the Rail trade for next year, as some railroad projects are just now making their appearance which will demand a certain amount of material for next year. The mills have not so completely sold up their capacity as to preclude the possibility of these orders being filled. The heavy specification on former orders for next year's delivery is simplifying the situation greatly, and is enabling the mills to determine definitely what they are able to do. The price does not change from $28. Buying of Structural Steel for next year's delivery goes on at 1.60c., Pittsburgh, for future delivery and at 2.75c. to 3.25c. at the mills or out of store for this year's delivery.

Old Material.—The lessened supply of Pig Iron has increased the demand for Cast Scrap, and the opening up of the Bar Iron mills has caused a better demand for Mill Scrap. Prices do not change from the following: No. 1 Wrought, $19.50, net; Iron Rails, $27.50, gross; Iron Axles, $28, net; Cast Borings, $10, gross; Wrought Turnings, $15.25, gross; Cast Scrap, $16, net; Car Wheels, $19, gross; Heavy Melting Steel, $19, gross; Old Steel Rails, $20, gross.

Birmingham.

BIRMINGHAM, ALA., September 1, 1902.

If there has been any change in the market it has been toward a hardening of values. The demand continues unabated for all deliveries that producers will entertain, and agreements as to price are not difficult to arrive at, particularly when the delivery is spot or nearby. In frequent cases the buyer fixes the price himself at an advance in his efforts to bring out any lots that may have been overlooked. The result is that all the yards are kept pretty clean, and accumulation is simply impossible. The sales for 1902 delivery were somewhat larger than they have been of late, because of the changed policy of one interest which has heretofore held out of the market, save in a very limited way. But the aggregate sales would, under ordinary conditions be considered as of no consequence.

For 1902 delivery there has been the usual price variation, heretofore reported, depending upon conditions that are special to the buyer. Some No. 2 Foundry sold as high as $24, while some sold at $23. The variation in price was influenced by nearness of delivery. These prices pertain to practically spot deliveries. For deliveries extending throughout 1902, at seller's option, the market is on a basis of $21.50 to $22.50, depending on conditions of the contract; and there is no trouble to place with ease any Iron that can be tempted out. The inquiry the past week showed an increase in volume, and there was an added keenness to the demand for "just a little, right away." But these appeals do not secure much Iron.

The price for No. 2 Foundry for 1903 delivery is quoted all the way from $18.50 up to $20, with sales at $18.50, $19 and $20. The majority of the sales were for delivery during the second quarter, as the first quarter has been pretty well sold up. About 1500 tons of No. 1 Soft was sold at $20, and several lots of No. 2 Foundry went at the same figure. A fair quotation for No. 2 Foundry and No. 2 Soft now would be $20. If one can hit it for less he is just that much ahead. No. 3 Foundry is quoted at $18 and Gray Forge at about the same figure. These quotations may not agree with some ideas entertained of the market, but they are based on actual transactions, and are as near correct as conditions permit.

As to belated deliveries we are making some headway in catching up on them, but it is a slow process. The Sloss Company will probably put in commission this week the only idle furnace they have, and local production will be increased that much. Strenuous efforts are being made to get out as much as possible of Foundry grades. In Basic Iron no sales are reported, and no effort is being made to supply other than the needs of the Steel mill. Concerning Steel there is nothing to be said that would be of interest to the trade. Only old business is being taken care of.

The Valley Iron Company, of which mention has been made formally, organized on the 27th inst. by the election of J. G. Battelle of the Columbus (Ohio) Iron & Steel Company as president, and Erskine Ramsay as vice-president. Charles E. Bowron of the Alabama Consolidated Company was made general superintendent, and J. F. Steins of Wheeling, W. Va., was elected secretary and treasurer. James Bowron was made chairman of the Executive Committee. Among the directors are Archer Brown of Rogers, Brown & Co.; H. A. Marting of Ironton, Ohio; J. G. Battelle of Columbus, Ohio; J. A. Andrews of Newport, Ky., and G. B. McCormack, general manager of the Woodward Iron Company. These names would indicate a strong team in the management of the company. Their property is situated in Dale County, Ga., and in De Kalb County, Ala. Their holdings comprise 13,700 acres of land running along the line of the Alabama Great Southern Railroad for about 10 miles. The average width is about 1½ miles. On the property are several veins of coal that produce a fine quality of Coke, and arrangements will at once be inaugurated looking to the rapid development of their resources. The building of 300 Coke ovens has been decided upon, and plans are being made for the erection of one furnace, which in time will be followed by a second. The property is so situated that the handling of material will be at the lowest minimum of cost. An incline 2400 feet long having a fall of 800 feet, makes the assembling of material an easy task.

It is now definitely determined that the Williamson Furnace will go into commission again. The controlling interest in the property has been secured by F. D. Dimmick, president of the Dimmick Pipe Works, and it will be added to those already in blast as soon as it can be made ready. But it is hardly probable that it will be ready in time for much business this year. The same interest controlling the furnace also control the foundry and machine shops of the company. It is understood that they will be operated as usual.

The advance in freight rates on Iron which has been anticipated for some time has been announced. It amounts to 50c. per ton, and becomes effective the 15th of the current month. The announcement created no surprise. The situation in Coke shows no improvement whatever. While it is still quoted at $4.50 to $5, whoever supplies his needs at that price can consider himself fortunate. Coal continues to be in fine demand, and ability to supply it promptly is sadly taxed. It is not probable that there will be any change for the better for some time, as the demand for cars to move the cotton crop will now greatly increase.

There is as yet no cessation in the projection of new enterprises, and with the advent of the coming fall we are promised a further impetus to our progress in this line. If "like begets like" we will soon be loaded with all we can carry.

The building fever continues to rage, and if that be evidence of prosperity we have it in abundance. In fact, the only clog to our more rapid progress is the lack of needed labor in all the lines of our industrial interests.

It is understood here that the forthcoming quarterly report of the Sloss-Sheffield Company will be very flattering to the management and very satisfactory to the stockholders.

Pittsburgh

(By Telegraph.)

PARK BUILDING, September 3, 1902.

Pig Iron.—There is practically no Pig Iron market, furnaces being sold up and consumers covered, many of them through first half of next year. This applies particularly to Foundry Iron, and it would be hard to find a foundry that has not covered its requirements for all of this year and well into next. Nearly all of the No. 2 Iron sold for delivery next year was on the basis of $21.50 to $21.75, Pittsburgh, but in exceptional cases higher prices were paid. No. 2 Foundry Iron for shipment over the rest of this year is held at about $23, Pittsburgh. Some Middlesbro Foundry Iron has been sold at $22.25, delivered Pittsburgh. There is not much doing in Bessemer or Forge. Several fair sized orders of Bessemer for delivery in the last quarter have been made at $21.75 at Valley furnaces, and for a small lot of prompt Bessemer Iron, $22 at furnace has been offered. Forge Iron is quiet, consumers being covered, and some Iron is being offered at less than $20.50, Pittsburgh, but without finding a buyer.

Steel.—The market is very quiet, and prices continue to show an easier tendency. Foreign Billets can be laid down in Pittsburgh at $29.75 to $30, and foreign Sheet Bars at $30.50 to $31. Sales have been made at the lower prices. Domestic Steel is held at about $31, but on a firm offer this price could be shaded. So many finishing mills are idle, including Sheet and Tin Plate plants, that more domestic Steel is being offered for sale in the open market than for a long time. This accounts for the fact that prices are weaker.

(By Mail.)

The fact that there have been two holidays in succession, Sunday and Labor Day, during which no freight was received, has allowed the railroads to clear up the freight congestion to some extent, and shipments of Coke and other

material are moving forward more freely than for some time. However, deliveries of Coke are still very unsatisfactory, and some of the furnaces in the Valleys are very short, not having more than two or three days' supply of Coke on hand, and in some cases not that much. The coming winter months are looked upon by the furnace operators with a good deal of misgiving and the probability is that there will be more or less trouble about shortage in cars and motive power just as soon as lake navigation closes, which will be about November 1. As pointed out in this report last week the only permanent relief that can be given will be in more motive power, more cars and more yard room. The many new blast furnaces that are being built mean a larger consumption of Coke and more adequate facilities for handling this increased business will have to be furnished by the railroads, or else there will be trouble right along.

The general situation in the Iron trade is without material change from that noted last week. Pig Iron is very strong and for prompt shipment commands high prices. Steel is somewhat quiet, with larger offerings by domestic mills than for some time. In Finished Iron and Steel the situation is no worse and no better. However, a large volume of tonnage is soon expected, as fall trade ought to open up within the next three or four weeks. Tin Plate, Sheets, Wire Nails and Wire continue dull, and the tone of the market on these products is weak.

Muck Bar.—There is not much inquiry for Muck Bar, and the market for domestic is about $36, Pittsburgh. Eastern makes of Bar are offered at about $35, Pittsburgh.

Rods.—Offerings of Rods are larger, and the tone of the market is not quite as firm as it has been. We quote Bessemer Rods at $36, delivered, Pittsburgh.

Ferromanganese.—We note a small sale of German Ferro at $51.25, Pittsburgh. No domestic is being offered.

Steel Rails.—Further orders for Steel Rails have been placed, including one contract for 50,000 tons by the Southern Pacific. The Associated Rail Mills have now taken orders for about 1,200,000 tons of Rails for delivery next year. We continue to quote Standard Section Steel Rails at $28, at mill.

Spelter.—Spot Spelter is almost impossible to obtain, and is quoted at 5.38½c. to 5.45c., Pittsburgh. Futures for delivery in October and later are quoted by the smelters at about 5.25c. to 5.28½c., Pittsburgh.

Hoops and Bands.—A fair amount of tonnage is being placed, but the Hoop mills could take care of more business if they had it. We quote Hoops at 1.90c. for 250-ton lots and over and 2c. in carloads. Bands are 1.90c. for Bessemer stock, 12-gauge and heavier, while for Open Hearth stock $2 per ton advance is charged.

Plates.—The situation in Plates is very strong, but the actual tonnage being placed is not quite as heavy as some time ago. We quote Sheared Plates for delivery this year at 1.75c. to 1.85c., at mill. For delivery after January 1 the official price of 1.60c. is quoted. These official prices are as follows: Tank Plate, ¼ inch thick and up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

Bars.—There is a fairly good demand for Steel and Iron Bars and prices, especially on the latter, are firm. Some of the smaller Implement makers, whose contracts have expired, are again figuring on additional tonnage. The mills have a good many old contracts and specifications on these are coming in in a fairly satisfactory way. We quote Steel Bars at 1.60c. at mill. All specifications for less than 2000 lbs. of a size are subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra, regardless of length. We quote Iron Bars at 1.80c. in carloads and 1.90c. in small lots, f.o.b. Pittsburgh, half extras as per National card.

Structural Material.—Notwithstanding the lateness of the season a good deal of tonnage continues to be placed, including a large amount of elevated track work, especially in the East. The American Bridge Company have taken a good deal of this kind of work recently, and more of it is in the market. The elevation of the Fort Wayne tracks through Allegheny is now under way, and this will require a large tonnage, which will be furnished by local mills. Prompt Beams and Channels continue very hard to get, and bring anywhere from 2.50c. up to 3c. and higher. Official prices, which really cover deliveries after January 1 only, are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inch, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Sheets.—A fair amount of tonnage is being placed in Black Sheets, but Galvanized continue very dull, and there is more or less demoralization in prices. We continue to quote No. 27 Black Sheets, box annealed, one pass through cold rolls, at 2.90c., and No. 28 at 3c. On a good specification it is possible some mills might shade these prices about $1 a ton. Galvanized Sheets in carloads and larger lots have been sold as low as 75 and 5 off, but the general market is 75 and 2½ off on carloads and about 75 off in small lots.

Merchant Steel.—Manufacturers of Merchant Steel have adopted the same differentials for small lots as have been in force for some time on Steel Bars. We quote Tire, 2.15c. to 2.25c.; Spring, 2.25c. to 2.35c.; Toe Calk, 2.30c. to 2.40c., base; Sleigh Shoe, 2.15c. to 2.25c. Differentials are as follows: Less than 2000 lbs of a size and not less than 1000 lbs., 10c. advance; less than 1000 lbs. of a size, 30c. advance; Cold Rolled Shafting is 47 per cent. off in carloads and 42 per cent. in less than carloads delivered in territory East of the Mississippi and North of the Ohio rivers. Tool Steel is 6½c. to 10c. for ordinary grades and 12c. and upward for special grades.

Skelp.—The market continues very quiet, and prices are weaker than for some time. We quote Grooved Iron Skelp at 2.10c. to 2.12½c., f.o.b. Pittsburgh. Steel Skelp is somewhat scarce, and brings higher prices.

Merchant Pipe.—A fair amount of tonnage is being placed, and prices are fairly firm, being shaded only in exceptional cases by some of the outside mills. Discounts to jobbers are as follows:

Merchant Pipe.	Black.	Galvd.
⅛ to ½ inch, inclusive	60	48
¾ to 12 inch, inclusive	67	55

Coke.—All records for Coke production were beaten last week, when nearly 300,000 tons were turned out in the upper and lower Connellsville regions. The supply of motive power and cars is very little, if any, better, and the outlook for improvement is not very bright. In the upper Connellsville region out of a total of 21,495 ovens, 21,023 were active last week, the output having been 254,748 tons of Coke. In the lower Connellsville region out of 3556 ovens, 3428 were active, the output having been nearly 50,000 tons. All sorts of fancy prices continue to be paid for Furnace Coke for prompt shipment, $4 and even $4.50 being readily commanded where prompt deliveries can be made. The subject of the price of Furnace Coke for next year's delivery is of a good deal of interest just now. We understand that several contracts have been placed for Furnace Coke for delivery all through next year at above $3 a ton.

Iron and Steel Scrap.—The Scrap market continues quiet, and the tone of the market is somewhat weak. Prices are about as follows: Low Phosphorus Melting Stock, $24.50 to $25; Ordinary Melting Stock, $21 to $21.50; No. 1 Cast Scrap, $19 to $19.50; Borings and Turnings, $10.50 to $11, all gross tons. No. 1 Wrought Machinery Scrap is quoted at $21 to $22 per net ton. No. 1 Wrought Scrap is $19.50 to $20 in net tons.

Iron and Industrial Stocks

American Bicycle stocks assumed considerable prominence during the week, a heavy decline taking place, due to default in the semiannual interest on the bonds. The common stock sold down to $1.75, and the bonds down to 56 per cent. Other industrials were generally firm and inclined to advance. Transactions were heavier all along the line. Sloss-Sheffield was the leader in this respect, especially the common stock, which scored an advance of about $21. National Enameling common also moved up sharply. Colorado Fuel fluctuated between $80 and $84.75.

Notice is given that the holders of the first mortgage bonds of the Troy Steel Company will receive payment of the pro rata share of the proceeds of sale upon presentation of their bonds at the office of the Albany Trust Company, Albany, N. Y. The decree value of each $1000 bond is $385.54.

Dividends.—The Cambria Iron Company will pay a semiannual dividend of 2 per cent. on October 1 to stock of record September 15.

The National Enameling & Stamping Company will pay the regular quarterly dividend of 1¾ per cent. on their preferred stock on October 1. Books close September 20 and reopen October 2.

The Railway Steel Spring Company have declared the regular quarterly dividend of 1¾ per cent. on their preferred stock, payable September 20 at the Atlantic Trust Company. Books close September 5 and reopen September 21.

The International Silver Company have declared a quarterly dividend of 1 per cent. on their preferred stock, payable October 1. Books for the preferred stock close September 16 and reopen October 2.

The New York Machinery Market.

NEW YORK, September 3, 1902.

A week when large business is not expected has just passed. The interruption occasioned by Labor's holiday, lasting from Friday until Tuesday last, had its usual effect, but, considering the remaining few days of the week under review business was better than many expected. While nothing of importance transpired the ordinary demand in all machinery lines kept up well. In the machine tool trade a good batch of inquiries is reported. Deliveries are now reported to be somewhat easier on the standard lines of machine tools. Prices are unchanged.

There is a little complaint among local dealers regarding the fact that all of the shaper builders who agreed to advance prices have not yet made their advances. It is said that a Western concern is a little backward in this respect. All of the others are, however, standing by their new schedule.

Builders of traveling cranes report extraordinary activity. One builder is not quoting delivery inside of a year, another prominent concern have closed their order books, as it is absolutely impossible for them to promise delivery within reasonable limits. A Western concern, who are the largest builders of locomotive cranes in the country, have already booked more orders this year than during any previous year. Prices for cranes are unchanged, but this is to be expected, as they have been very firm for some time past.

Announcement is made in London that the English branch of the Otis Elevator Company, Limited, have absorbed the business of R. Waygood & Co., the principal builders of elevators in England. The Otis types of machines will hereafter be constructed at the English works. That negotiations to this end were in progress was known in some quarters of the trade for some time and it is believed here that the Otis Company will expend considerable money in remodeling the English plant.

It was reported in the trade that the Bullard Machine Tool Company of Bridgeport were to build an entire new plant in that city. We are informed on good authority that such a move is not contemplated at this time. The report originated from the fact that the Bullard Company purchased a tract of land in Bridgeport, which is not in the vicinity of their present works. It is possible that a foundry may be erected on this tract at a future date, but even this has not definitely been decided upon. A fine new addition has recently been built to the machine shop of the present works as well as a modern blacksmith shop. These extensions have made the plant thoroughly up to date and obviate the necessity of a new shop.

The Maxwell M. Mayer Electric Company of 216 Centre street, New York, electrical engineers and manufacturers of the Mayer dynamos and motors, are preparing to add extensively to their plant so as to enable them to turn out larger sizes of electrical apparatus. Their present line of dynamos for lighting, plating and electrolytic work as well as motors of the smaller sizes for general power purposes will be continued. It is intended to install lathes, boring mills and other heavy machine tools. The exact list of machinery has not been compiled as yet. The company expect to move into their larger quarters next spring. They are capitalized at $100,000, and the officers are as follows: President, Maxwell M. Mayer; secretary, Wm. F. Wahrenbergen, and treasurer, Frank Skidmore.

The National Foundry Company of 32 Sandford street, Brooklyn, are having plans prepared by Architect Frank S. Lowe of Brooklyn for a large addition to be built to their plant. The main building will be about 300 x 200 feet. In addition to cast iron pipe the company contemplate the production of machine castings. They are in the market for electric elevators and a trolley system for conveying castings, &c. H. R. Read, the treasurer of the company, informs us that he would also be pleased to learn of any labor saving appliances adapted to foundry work.

Plans and specifications have been prepared by the Rock Plaster Company of 11 Broadway, New York, for a new mill to be erected at Oak Point Casanova Station, Bronx, N. Y., for the manufacture of Rock Wall plaster, Rock Wall cement, plaster paris, ground slaked lime and for mixing Portland cement and sand for building purposes. This plant will consist of four buildings and cover about 4 acres, including storage piles for gypsum rock, sand and coal. The buildings will include a main mill building, consisting of mixer building, 48 x 136 feet; lime building, 24 x 96 feet; engine room, 32 x 80 feet; plaster stucco room, 24 x 32 feet; calcining room, 40 x 68 feet; crusher room, 28 x 68 feet, and boiler room, 32 x 32 feet; sand house for storage of dry sand, barn and fourth office. The main mill is divided by two thick fire walls of brick into three separate parts. Plant involves use of 400 boiler horse-power distributed to two engines: 1, an Allis Corliss engine of 250 horse-power, normal running, simple non-condensing, and 2, a Payne Corliss engine of 150 horse-power as auxiliary power. Boiler power is furnished by two 200 horse-power horizontal multitubular boilers, one each furnished by Kendall Company of Boston and Coatesville Company of Coatesville, Pa. The plant will have a water front of 350 feet and ample depth at pier head for 1000-ton vessels. A substantial pier, 40 x 100 feet, provided with two steel gantry cranes of 1 ton each capacity, will provide ample unloading and shipping facilities. About 2000 feet of trestle run by cable and provided with automatic saddle side dumping cars of approved type will serve to distribute rock sand and coal in proper storage piles. Cars are to be furnished by G. A. Mead Company; calcining machine by Butterworth & Lowe, Grand Rapids, Mich. E. A. Darling and H. W. Goldthwaite are the engineers in charge of the work.

The factory buildings of the Delaware Marine Supply Mfg. Company of Wilmington, Del., consisting of a brass foundry, machine shop, pattern shop, &c., which have been under course of construction for the past four months, being completed, the company are now ready for business, and will take up the manufacture of ships' fittings for vessels of all classes. They will also produce fittings for Government vessels, according to the department's latest designs, and will promote an extensive consignment business, which will include all goods pertaining to marine work, and to this end, we are informed, would be pleased to hear from manufacturers of same.

The Pennsylvania Railroad have given the Allis-Chalmers Company orders for a number of Sederholm boilers, for their Broad street station in Philadelphia, as well as for their Juniata shops.

From the bids opened on August 26 by the Bureau of Supplies and Accounts, Navy Department, we select the following which refer to machinery:

Norfolk.

One patent back geared screw engine lathe, American Tool Works Company, Cincinnati, Ohio, $390 and $440; Pratt & Whitney Company, Hartford, Conn., $468; Smith-Courtney Company, Norfolk, Va., $480.

One 16-inch extension base shaper, American Tool Works Company, $440; Smith-Courtney Company, Norfolk, $485.

New York.

Bidder 3, The Fairbanks Company, 416 Broome street, New York City; 23, Drew Machinery Agency, Manchester, N. H.; 38, E. J. Etting, 1000 Land Title Building, Philadelphia, Pa.; 51, Manning, Maxwell & Moore, 85 Liberty street, New York City; 55, Pratt & Whitney Company, Hartford, Conn.; 58, Manhattan Supply Company, 127 Franklin street, New York City; 62, Hendey Machine Company, Torrington, Conn.; 71, Niles Tool Works Company, Hamilton, Ohio; 74, Detrick & Harvey Machine Company, Baltimore, Md.; 80, Garvin Machine Company, Spring and Varick streets, New York; 82, Springfield Machine Tool Company, Springfield, Ohio; 86, I. H. Johnson, Jr., & Co., 1434 Callowhill street, Philadelphia, Pa.

Class 59, one 36-inch open side planer—Bidder 74, $2934; 60, one 30 x 16 inch triple geared engine lathe—Bidder 80, $1346; 3, $1390; 86, $1604; 71, $1745; 51, $1850; 61, one 72 inch full universal radial drill—Bidder 71, $1195; 51, $1250; 3, $1475; 62, one 24-inch vertical drill press—Bidder 51, $145; 80, $180 and $210; 3, $229 and $180; 63, one 20-inch vertical drill press—Bidder 51, $106; 80, $118; 3, $128 and $118.75; 64, one cold saw cutting off machine—Bidder 7, $1350; 51, $1690; 65, one portable cylinder boring machine—Bidder 71, $224; 51, $250; 23, $228 and $304.50; 66, one portable radial drill—Bidder 23, $142.43; 51, $151; 67, two bench drills—Bidder 80, $68; 55, $100; 68, one magnetic metal separator—Bidder 58, $190; 51, $210; 38, $250 and $215; 69, one lathe center grinding machine—Bidder 23, $14.80 and $45.50; 70, two 16-inch swing by about 10-foot back geared engine lathe—Bidder 3, $880 and $872; 51, $1784, $1820 and $2140; 55, $919 and $852; 62, $1144; 80, $836 and $792; 82, $1076.

League Island.

Bidder 1, National Tube Company, 267 South Fourth street, Philadelphia; 2, Manning, Maxwell & Moore, 85 Liberty street, New York City, 3, the Detrick & Harvey Machine Company, Baltimore; 5, G. W. Field, 633 Market street, Philadelphia; 7, Heine Safety Boiler Company, Fidelity Building, Philadelphia; 9, Oil City Boiler Works, Putnam street, New York City; 10, Babcock & Wilcox Company, 85 Liberty street, New York City; 11, Manhattan Supply Company, 127 Franklin street, New York City; 12, Montgomery & Co., 105 Fulton street, New York City; 14, the Fairbanks Company, 416 Broome street, New York City; 15, T. B. Bickerton, 12 North Fifth street, Philadelphia.

Class 1, furnishing and installing one 240 horse-power tubular boiler—Bidder 7, $5085; 9, $5245; 10, $5321 and $5877; 8, chucks, drills, countersinks, &c.—Bidder 5, $146.40; 12, $158.90; 11, $168.15; 14, $170.14; 15, $222.05; 11, one planer, 60 inch—Bidder 2, $8725; 3, $8790.

Boston.

Class 11, one universal radial drill, Hill, Clarke & Co., Boston, $1265; American Tool Works Company, Cincinnati, Ohio, $1655.

Class 18, one hand power traveling crane for power house, Manning, Maxwell & Moore, New York, $1645; Niles Tool Works Company, Hamilton, Ohio, $1958; E. J. Etting,

Philadelphia, $2215; Brown Hoisting Machinery Company, Cleveland, $2500.

Proposals will be received at the Bureau of Supplies and Accounts, Navy Department, until September 9, 1902, to furnish at the Navy Yard, Portsmouth, N. H., a quantity of cast iron pipe and specials, motors, machine tools and rock crushing plant.

New York.

NEW YORK, September 3, 1902.

Pig Iron.—Importations of foreign Iron continue, and some further cargo lots of English Foundry Iron have been ordered abroad. For large quantities Middlesbrough can be laid down for shipment at about $19. For spot lots considerably higher prices are realized, particularly in domestic, for which as high as $25 to $26 for No. 1 is paid. However, the quantities of domestic Iron for immediate delivery are so small, and each transaction is so much dependent upon special circumstances that no general quotation can be given. For delivery in 1903 the following quotations are made: Northern Iron, at tidewater, No. 1 X, $23.25 to $24.75; No. 2 X, $22 to $22.75; No. 2 Plain, $21 to $21.75. Tennessee and Alabama brands, in New York and vicinity: No. 1 Foundry, $22.25 to $23; No. 2 Foundry, $21.25 to $22; No. 3 Foundry, $21 to $21.25. Foreign Ferromanganese is offered at $51 to $51.50, delivered.

Cast Pipe.—A contract was placed on Tuesday for 1500 tons of 20, 12 and 6 inch Pipe by the City of New York. On the 8th the city of Los Angeles, Cal., will open bids for 4000 tons. Orders for small lots are very numerous, the demand keeping up very well, considering the inability of foundries to make definite promises as to deliveries, being badly hampered for lack of Pig Iron. Prices keep advancing. It is almost impossible to quote spot prices, as buyers pay what sellers choose to ask.

Steel Rails.—The Eastern mills do not report any special movement. It is probable that the Canadian Pacific order for about 50,000 tons will be placed at an early date. It is not likely that much of it will come to domestic mills. We continue to quote $28 for Standard Sections, at Eastern mill.

Finished Iron and Steel.—The railroads are now entering the market for their bridge requirements for 1903. Inquiries from four leading Western lines approximate 40,000 tons. Roads in the Central West will shortly place orders for fully as much and New England's purchases will be about 15,000 tons. In all, about 100,000 tons are now in sight. This makes the outlook for 1903 very encouraging in the bridge line. Contracts for Structural Material for building purposes are being placed for considerable quantities. The consumption seems to be increasing instead of diminishing. Some orders are going abroad for Beams, but they are not so large or so numerous as anticipated. Foreign Beams can be laid down in New York for 1.85c. to 2c., duty paid, but most buyers are disposed to wait for shipments from home mills. Deliveries of plain Shapes can be made in six to eight weeks by some mills, but on riveted work six to eight months are required. We quote, at tidewater, as follows, but for small lots and prompt delivery much higher prices are being obtained for Structural Material and for Plates: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c. Sheared Steel Plates are 2c. to 2.10c. for Tank, 2.10c. to 2.20c. for Flange, 2.25c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.95c. to 2.10c.

Metal Market.

NEW YORK, September 3, 1902.

Pig Tin.—Owing to heavy arrivals the market has declined sharply. The lowest point of the week was reached at the close to-day when spot was sold at 27.05c. Quotations are as follows: Spot, 27.05c. to 21.10c.; September, 26½c. bid, 27c. asked; October, 26.50c. bid, 26.75c. asked; November sellers at 26.10c.; December sellers at 25.87½c. The London market also declined sharply, closing £123 for spot and £117 2s. 6d. for futures. Business has been quiet as might be expected under existing conditions. The shipments from the Straits for August were the heaviest for any single month during the last five years. They amounted to 5200 tons. It is reported from London that the Chinese in the East are heavy sellers for prompt as well as future delivedy. According to the statistics compiled by C. Mayer, secretary of the New York Metal Exchange, the visible supply was as follows:

	Tons.
Total visible supply August 31, 1902	16,293
Against visible supply July 31, 1902	16,809
Against visible supply August 31, 1901	16,327

Copper.—Continued weakness has characterized the market. Prices have declined and the purchaser still holds the situation. Lake is quoted at 11.30c to 11.60c. for spot to September delivery. October to December Lake is quoted at 11.25c. to 11.55c. Electrolytic and Casting spot to December are quoted at 11.20c. to 11.35c., and Standard spot to December is 10.70c. to 11.15c. on 'change. The London market closed at £51 13s. 9d. for spot and £52 for futures. Best Selected declined to £55 10s. The statistics published this week show that on January 1 of this year the enormous supply of 135,524 long tons existed in this country. During the first six months of this year through heavy exportation and large domestic consumption this quantity was reduced by July 1 to 99,203 long tons. But through the decrease in exportation and smaller consumption during the month of July it is estimated that this quantity was increased by 5756 tons. According to this calculation, on August 1 the supply in this country was up to 104,959 long tons. As exports have been moderate and consumption has not increased here a further accumulation of at least 5000 tons is said to have taken place during the month of August. The statistics of C. Mayer, secretary of the New York Metal Exchange, show a total exportation of 11,469 tons for the month of August.

Pig Lead.—A good demand is reported. Prices are unchanged. The Smelting & Refining Company still quote 4.12½c. spot and 4.10c. futures for Desilverized, New York. The London market has declined to £10 18s. 9d.

Spelter.—Is still firm, with prices showing a continued advance. The spot metal is very well held by a New York concern who recently acquired a 1000-ton lot which had been held in reserve for about four years. Spot is quoted 5.50c. here, and shipments from the West are obtainable at 5.42½c. St. Louis quotes 5.25c. and London is cabled £19 7s. 6d. An important announcement is made in the trade to the effect that the Collinsville Zinc Company of Collinsville, Ill., who have been idle for about a year owing to low prices, and the success of the concern in the gas belt will resume operations. The production of this plant will relieve the situation somewhat. Edward F. Byrne of 100 William street has been retained as sales agent for the company. It will be recalled that Mr. Byrne handled this well-known brand before the closing down of the plant.

Antimony—Is unchanged. Hallett's is quoted 8c.; Cookson's, 10c., and other brands, 7¾c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and term of order. Smaller lots are quoted as high as 60c., according to quantity.

Tin Plates.—The market is dull and uninteresting, with an absence of any important buying. Prices are without change. The American Tin Plate Company are quoting for delivery up to December 1 on the basis of $4.19 per box for Standard 100-lb. Cokes, f.o.b. New York, or $4, f.o.b. Pittsburgh. The Welsh Tin Plate market has declined 1½ pence, quotations being now 12 shillings 4½ pence, Swansea.

The Sheffield Furnaces Sold.—The Tennessee Coal, Iron & Railroad Company have sold their furnace plant at Sheffield, Ala., and their Russellville ore property to the United States Ore Company. The Sheffield plant, formerly operated by the Sheffield Coal, Iron & Steel Company, consists of three blast furnaces with, however, only sufficient blowing power to operate one furnace regularly. The United States Ore Company were originally organized by John W. Gates, who, however, sold his interests some time since. The principal stockholders now are William Edenborn and W. L. Walker of the United States Steel Corporation. The company own large and valuable tracts of brown ore lands in Northern Alabama and Tennessee, mining it extensively and selling it to furnaces at Sheffield and elsewhere. Those interested studied the question of erecting a blast furnace plant, but abandoned the idea when the purchase of the Sheffield plant was brought up for consideration. The Tennessee company were laboring under the disadvantage, with the Sheffield plant, of not having an adequate ore supply. The coal in the immediate vicinity is not suitable for coking. The nearest source of supply is at Jasper, and at times coal has been shipped from the Birmingham district proper. The Sheffield district also draws upon Stonega. It is understood that the United States Ore Company are negotiating for coal property.

The Troy Steel Products Company.—The interests which purchased the Troy Steel Works recently at public sale have formed the Troy Steel Products Company, there being among the incorporators Everett D. Arnold of New York, who was formerly superintendent of the plant, and William Francis Donovan. The latter, who will probably have the active management of the new enterprise, was formerly vice-president of the Yale &

Towne Mfg. Company, was later connected with the Crane Company of Chicago, and with the St. Louis Tobacco Company. It is proposed to thoroughly remodel the furnace plant by putting in inclines, new trestles, ore pockets and ore handling machinery. The existing blowing engines will be remodeled and probably two new modern blowing engines be installed. There is in contemplation the erection of an open hearth steel plant capable of producing about 1000 tons per day and the building of a number of finishing mills. It is likely, too, that the company will acquire coal property and erect coke ovens.

August Fluctuations in Iron Stocks.

The following table shows the extent of transactions and the fluctuations in quotations of the stocks of iron and steel companies in the month of August, with the dates on which the highest and lowest prices on each stock were realized:

Cap'l issued.		Sales.	High-Date. est.	Aug.	Low-Date. est.	Aug.
$17,701,500	Am. Bicycle Co., com.	50,600	7⅝	6	3½	29
9,294,900	Am. Bicycle Co., pref.	4,700	20¾	4	17½	28
9,500,000	Am. Bicycle Co., bonds.	273,500	68½	2	57	29
41,233,300	Am. Can, com.....	2,661	12⅝	1	11½	12
41,233,300	Am. Can, pref.....	9,900	53½	4	50¾	28
29,000,000	Am. Car & F'dry, com.	16,700	34¾	27	32	1
29,000,000	Am. Car & F'dry, pref.	2,550	92¾	8	91½	4
24,100,000	Am. Loco., com.....	3,600	34⅝	27	31½	13
25,000,000	Am. Loco., pref.....	9,700	96	28	93	15
45,000,000	Cambria Steel.....	48,000	28¼	21	26¼	2
7,000,000	Centr. Foundry, com..	1,100	2½	11	2⅛	1
7,000,000	Centr. Foundry, pref.	400	12½	14	11½	23
17,000,000	Colo. Fuel & Iron....	360,700	93	1	73¾	25
25,000,000	Crucible Steel, com...	....	22⅝	29	21½	22
25,000,000	Crucible Steel, pref...	....	87	29	85⅞	2
1,975,000	Diamond State Steel.	....	1⅝	20	1½	28
2,368,100	Empire I. & S., com..	....	10½	4	10	29
2,281,400	Empire I. & S., pref..	....	50	26	49	29
10,000,000	Geo. A. Fuller, com...	12,250	62	12	59½	23
5,000,000	Geo. A. Fuller, pref..	7,600	108⅜	1	102½	22
15,000,000	Inter. Pump, com....	1,200	53⅛	6	52⅛	18
8,850,000	Inter. Pump, pref....	400	93	29	91	14
11,000,000	Inter. Silver.....	8,300	20	18	11⅛	12
8,396,000	Natl. Enam., com....	5,500	34¼	8	30¼	4
15,441,800	Natl. Enam., pref....	1,170	90	21	89	5
4,449,800	Otis Elevator, com...	7,520	45	22	35½	1
6,350,000	Otis Elevator, pref...	650	103½	28	101	23
10,750,000	Pa., new, com., Phil..	1,050	49	29	42	1
16,500,000	Pa., new, pref., Phil..	5,250	105	27	96	6
12,500,000	Pressed Steel, com....	39,450	51¾	29	46½	6
12,500,000	Pressed Steel, pref...	8,900	88¼	26	85	2
10,000,000	Railway Spr., com....	7,450	32½	27	30½	1
10,000,000	Railway Spr., pref...	3,800	89¾	29	88	25
27,191,000	Rep. I. & S., com.....	100,810	21½	26	18½	1
20,306,900	Rep. I. & S., pref.....	17,200	78⅞	28	75⅜	1
7,500,000	Sloss-Shef. S. & I., com.	6,700	65	29	38½	1
6,700,000	Sloss-Shef. S. & I., pref.	4,400	91½	29	82¾	4
20,000,000	Tenn. Coal & Iron....	159,800	71⅝	26	67½	13
1,500,000	Tidewater Steel.....	2,250	7⅛	27	6	19
12,106,000	U. S. C. Pipe, com...	....	12½	29	11½	22
12,106,000	U. S. C. Pipe, pref....	....	46¾	2	45	22
510,361,300	U. S. Steel Co., com..	162,750	41⅝	21	39⅜	1
508,511,200	U. S. Steel Co., pref..	100,000	90¾	15	89¼	12
8,425,000	Virg. Iron & Coal, com.	22,500	23½	14	12½	5
10,000,000	Virg. Iron & Coal, 5 per cent. bonds.....	352,000	75	26	63	2
1,500,000	Warwick I. & S.....	2,000	7	4	6½	18

A curious condition of affairs has developed in the relations between the Tennessee Coal, Iron & Railroad Company and their coal miners in the Birmingham district. It appears that the company collect for the miners' union the dues from its members. Recently the union voted to contribute certain sums for the assistance of the striking miners in the anthracite coal regions. Some of the Alabama miners have failed to pay this contribution and the Tennessee Company have collected it only upon the written individual order of the miner. Now the contributing union miners decline to work with the men who have not paid and demand that the Tennessee Company collect the assessment for them. This the company decline to do and there is danger of trouble ahead.

The Sangamon Mfg. Company, Springfield, Ill., are preparing to occupy the buildings which were constructed for the Patrons Mfg. Company, no longer in existence. The main building is over 600 feet long and the smaller building, which will be used as a foundry, is 80 feet square. The beds for the engines, water pipe connections and other necessary fixtures are already in the buildings and the installation of machinery began on September 1. Additional machinery will be purchased later. The Sangamon Company will manufacture mining cars, mining tools and stoves. Considerable business for mining cars and mining machinery has been offered, but thus far the company have refused all orders, but expect soon to be in a condition to accept some of the contracts. The directors of the company are as follows: Thomas White, president; L. K. Davis, secretary and treasurer; W. A. Colvin, secretary Board of Directors; Irving Barker, Harmon Brown, Frank B. Dooling, John Ettelbrick, R. A. Higgins, N. R. Johnson, W. A. McCullough, Edward Ready.

The German Electrical Industry.

Frank H. Mason, Consul-General, sends the following interesting report:

What is called in headlines by the German press "The catastrophe in the Schuckert Electrical Company" has during the past week recalled public attention sharply to the conditions under which some of the great electrical corporations of Germany were promoted, and the embarrassments which some of the methods employed have more or less inevitably entailed. The event alluded to was a meeting on the 26th inst. of the stockholders of the Schukert Electrical Company at Nuremberg, at which the managers announced that, through depreciation of plant and material, insolvent accounts and necessary appropriations for a reserve fund to meet further depreciations, the company had suffered losses aggregating 15,500,000 marks, or something more than $3,500,000. As the Schuckert Company are one of the foremost corporations of their class in Europe, with an up to date plant and all the accompaniments of a large business, some surprise has been expressed that their affairs should make such a bad showing for their stockholders. The explanation leads back to the fact, now well known here, that the sudden rise of some of the German electrical companies into corporations of vast resources and activities was, in some cases at least, the result of skillful and artificial creation of markets for products, rather than the supply of an actual and legitimate demand.

Financing Electrical Concerns.

Concisely stated, some of these companies bought their orders for electrical installations and materials by financial operations that left them shareholders in many enterprises which have since proved less promptly lucrative than had been hoped, and have thus drawn more or less heavily upon the capital of the parent companies. To understand how all this came about it should be remembered that German progress in electrical science was for a long time far in advance of popular appreciation of its advantages. The companies organized and equipped for the manufacture of lighting and power plants could not wait for the slow growth of public demand for such improvements, and they therefore undertook to finance and erect such installations themselves, confident that, once established and in use, the public would not fail to appreciate them and invest in their securities. This went very well for a time. It created a large and ready market for electrical machinery and materials at high prices, and supplied hesitating municipalities with electric tramways and lighting plants which their citizens greatly enjoyed, but which were built and for a time managed by the electrical manufacturing companies at their own expense. Inevitably, this process of consuming their own capital necessitated heavy loans and frequent increases in the stock of such corporations, together with a steady expansion of their manufacturing capacity. Some of the companies, especially the Schuckert corporation, made enormous investments in electric installations for the manufacture of calcium carbide, putting in the machinery at their own prices but receiving for it little or nothing except stock in the carbide plants. Thus the supply of acetylene material was soon far beyond all legitimate requirements, prices collapsed and the carbide industry suffered a serious and permanent reverse.

The Chicago Machinery Market.

CHICAGO, ILL., August 30, 1902.

Activity and expansion is the phrase which best characterizes the condition of the machinery industry in this section. With few exceptions reports are of busy shops with constantly increasing capacity through the erection of larger buildings and increased equipment of modern tools. Orders are heavy; shipments, both domestic and foreign, are active, and the outlook for further orders of importance was never brighter. There is scarcely a section in this country that does not participate in the prosperity, contributing orders for machinery of some kind or another. The foreign trade, too, seems to be increasing rather than otherwise wherever it is found possible for domestic manufacturers to accept new business.

From manufacturers of power transmission machinery comes word that all are busy with orders booked ahead sufficiently to insure the employment at full capacity of all the principal plants during the fall. This means not merely the present capacity of the plants, but the employment of increased resources through the finishing of new buildings and the installment of new machinery.

In the lines of engines, boilers and pumps the prominent features already noted seem to be intensified, several manufacturers reporting that the volume of business during August has been the largest transacted in the history of the various companies. This is the more remarkable in that the months of July and August are generally the slowest, especially in the department of gas and gasoline engines, and, furthermore, the outlook for the next few months insures the same degree of activity. The only drawback seems to be the difficulty in securing the necessary material required for obtaining best results. In steam driven engines the demand is well distributed, including both vertical and horizontal types. In gas engines the prominent feature is the large shipments to the mining sections of the country, but electric lighting plants and railways, too, have been little behind in their draft upon manufacturers of these specialties. So great is the pressure upon these manufacturers that the constant building of new shops and the employment of new equipment scarcely enable them to fulfill contracts within the specified time. It is in the line of engines, boilers and pumps that the greater portion of the foreign business seems to be done, the records showing important shipments during August to Mexico, Yucatan, Peru, the Yukon, Australia, Japan, Portugal, Holland and Germany.

Advices from manufacturers of machine tools indicate a confident, buoyant feeling, with satisfaction with the orders already received and a veritable flood of new business anticipated by the most sanguine, but many of them are having all that they can possibly do to satisfy customers and live up to the deliveries promised. Some manufacturers note that their present activity eclipses all records, and others, although they have doubled their floor space and employed new equipment correspondingly, are still away behind in the filling of orders. It is noted that the export trade has grown conspicuously, shipments being made particularly to Asia, Australia and Europe, more especially to France. Manufacturers' agents and dealers testify to sales during the month of August exceeding those for any like period for over a year. One feature of particular interest is that the inquiries for tools are largely for the larger and better class, and it seems evident to those dealers who are close to the consumers that more than ever is preparation being made for a tremendous volume of business during the next six months. Many of the railroads are doubling shop capacity, and the contract shops are little behind in supplying new equipment. Desirable second-hand tools are practically out of the market, there being much difficulty experienced in satisfying customers.

Manufacturers of special machinery, both in season and out, unite in reporting large shipments and heavy contracts. This is especially noticeable in such lines as mining, milling and refrigerating machinery, the business being confined not merely to renewals and enlargement of present plants, but to the placing of orders for entire new plants in the industries mentioned.

As a natural sequence to the large transactions above noted, the demand for all sorts of foundry, shop, factory and mill supplies has been on the most liberal scale, foreign as well as domestic, compelling manufacturers of such supplies also to expand by increasing capacity and the renting or purchase of new buildings. The difficulty in obtaining not only material but skilled labor to the requisite number is particularly felt by the larger foundries.

Power and Transmission Machinery.

Dodge Mfg. Company, Mishawaka, Ind., say that orders seem to continue in about the same ratio as they last reported, and no apparent dullness is noticed in any particular line of trade. The company are adding considerable machinery to their plant and a new 500 horse-power boiler, and are contemplating the purchase of an additional engine of about 750 horse-power. They also are about ready to begin the construction of a new warehouse, 200 x 100 feet, and a new building for the manufacture of bolts, nuts and washers. This latter building will be 200 x 100 feet, two story, mill construction. The second story will be used for installation of a mechanical testing laboratory and assembly rooms for the employees.

The American Hoist & Derrick Company, St. Paul, Minn., advise that the conditions in the hoisting machinery line are quite active and the indications are that they will continue so during the fall.

The Industrial Works, Bay City, Mich., continued to experience an active demand for power transmission machinery throughout the month of August, insuring a maintained operation of the plant at full capacity.

Webster Mfg. Company, Chicago, report business exceedingly heavy, it requiring all their attention to getting out orders already booked.

Engines, Boilers and Pumps.

Marinette Iron Works Mfg. Company, Marinette, Wis., state that the condition of business at this time is very good, with the prospect of continuing through the fall and coming winter. They are enjoying a good trade on gas engines for all lines of power service, but there is a greater demand for them in connection with electric lighting plants, both private and municipal. Three engines were shipped during the past month to foreign countries, two going to Portugal and one to Japan, and an order was received by cable from Portugal last week for two more. The company anticipate a very good export trade, especially after establishing some foreign agencies, the business thus far received being entirely through correspondence.

Union Steam Pump Company, Battle Creek, Mich., find that business still keeps up well, but the difficulty of getting material is something that is handicapping the very best results. They are putting up new buildings all the time and still are short of room.

American Steam Pump Company, Battle Creek, Mich., report that business during the month of August has been the largest in the history of the company. They are filling large orders for both domestic and foreign shipment. The outlook for trade for the fall and winter is better than ever before. Fair progress is being made on their new pattern house, and they are gradually increasing their capacity through the installation of new equipment. The company find a general demand for pumping machinery from all classes of trade both at home and abroad.

The Weber Gas & Gasolene Engine Company, Kansas City, say that the months of July and August, which are generally slow months in their line, have been the heaviest months experienced by them since they have been in the business, and with abundant crops in the West they are assured of continued increase. They have largely increased their facilities during the past year. Shipments have recently been made to Mexico of a large amount of gasoline power plant equipment for the Batopilas Mining Company, including what they believe to be the first gasoline locomotive built. This shipment, weighing over 50 tons, was built on the sectional plan, no part, with few exceptions, weighing over 250 pounds, it being for muleback transportation to the mines. They have also recently made shipments to Holland, West Australia, Peru, Yucatan and Germany, and also to the Yukon for pumping for placer mining. They have found the export trade very satisfactory.

The Otto Gas Engine Works, Chicago, state that at this time and during the past few months their business has been about on a par with the corresponding time of last year, especially in the gas and gasoline department. An increase and growing demand is noted for this line of machinery, particularly with the railroad trade. They have, during the year, sold a number of coaling stations complete, as well as many electric light plants, besides having done a large volume of business in the way of gasoline pumping plants for different lines of railways throughout the country. Collections have been very good.

The Allis-Chalmers Company, Milwaukee, state that during August inquiry has kept up and about the customary number of engine orders have come to hand, among the more important ones being two vertical cross compound direct coupled engines of 4000 horse-power each for the New Orleans Railway. The Sloss-Sheffield Iron & Steel Company ordered two additional blowing engines, these being vertical machines. The Denver Tramway Power Company ordered two horizontal cross compound direct coupled engines, one

being of 3000 horse-power, the other of 2500 horse-power. Inquiry is still excellent.

W. W. Whitehead Company, Davenport, Iowa, have continued to run to the limit of capacity, the shop being full of work, and prospects for the future are full of encouragement.

Machine Tools.

Geo. Whiting Company, Chicago, say that prosperity still continues, and from all appearances the future augurs the same continued success without a blot on the horizon that they can see. They have found it necessary to considerably enlarge their equipment by the addition of several machines in order to keep up with the growing demand for their high grade machines and prepare themselves for the inevitable rush that is slowly but surely developing, and in such magnitude as to completely eclipse any former records of this country. They have received a number of orders for machines during the past month, and are doing all that is possible to satisfy customers and live up to deliveries, and are now in better shape than ever to get out orders quickly and at a reasonable price.

The B. F. Barnes Company, Rockford, Ill., state that during the last year they have almost doubled their floor space, installing new equipment of up to date machinery for the construction of machine tools. They have also added several new drills and one lathe. They are and have been all summer running to full capacity and still are away behind in the filling of orders. Quite an extensive export trade is enjoyed, particularly with Asia, France and Australia. Orders, both domestic and foreign, come from manufacturers of all kinds who are in need of drills and lathes for their more complete equipment. Collections are generally good. From the inquiries which are being received from every quarter (to say nothing of the orders) the company think the outlook for fall and winter trade very promising, and are confident they will have all the business they can handle.

Joseph T. Ryerson & Son, Chicago, state that their sales of machinery during the past 30 days have exceeded those of a like period for over a year. The inquiries for all classes of tools are increasing in number, and the character of equipment inquired for is tending toward the larger and better class of tools. Preparations are evidently being made for a tremendous volume of business in the near future. Many of the railroads are doubling their shop capacity and existing contract shops are adding to their plants. Second-hand tools are practically out of the market. The manufacturers contemplating an increase to their producing ability will do well to enter orders without delay, as the coming year will probably find all tool and machine makers with order books full. The following is a partial list of sales during the past 30 days: East Jersey Pipe Company, New Winona Mfg. Company, James Russel Boiler Works, Suffolk & Carolina Railway, Freeman Foundry & Machine Company, American Fire Engine Company, Grant C. Nobbs, Minneapolis Threshing Machine Company, Titusville Iron Works, C. Murphy, Heine Safety Boiler Company, James R. Gemmill, Madden Boiler Works, Wilson Steam Boiler Company, Joliet Bridge & Iron Company, Stillwell-Bierce & Smith-Vaile Company, Springfield Boiler & Mfg. Company, United States Filter & Water Company, Carl Binder, Albert B. Bowman, Missouri Boiler Works, Oil City Boiler Works, Broderick & Quinlan, McCormick Harvesting Machine Company, Niles Tool Works, Chicago Terminal Transfer Railway, Manning, Maxwell & Moore, A. Baldwin & Co., Terre Haute Boiler Works, Hansell-Elcock Company, Union Pacific Railway Company, C. A. Thompson, James Ross, Turner & Brownlie, P. W. Wiggot, P. J. Connelly.

Ransom Mfg. Company, Oshkosh, Wis., report a good volume of business and are looking for a good fall and winter trade.

The Armstrong Brothers Tool Company, Chicago, advise that the conditions of trade during the month of August have been all that they could ask. The demand for specialties has been very heavy, and although the month of August is ordinarily an off month, sales during this period have again passed the high water mark of any previous month in their experience. While at present they are able to give prompt shipments, they have prepared for a still heavier increase in business by considerably increasing their plant. Among other improvements they have installed a number of Cleveland automatic screw machines of large size and of the latest improved design. Collections have been easy, and generally the month has been a good one for business.

Special Machinery.

Allis-Chalmers Company, Chicago, during the month of August booked a number of large orders for blowing, hoisting and power engines of practically all the types built by them, including one engine of the same type as the Manhattan, which will be used for generating electricity in an Eastern power plant. Business has been unusually large in the mining department, including a large order of machinery for the Horseshoe Mining & Milling Company, with mines located at Deadwood, S. Dak. The flour mill department, too, has been very busy with a large volume of business, having recently booked one of the largest single orders for flour mill machinery ever placed in the Northwest, for the Washburn Crosby Company of Minneapolis. This mill will rank as one of the largest mills in America, having a capacity of 3500 barrels per day. The saw mill department is exceedingly busy, having recently booked a large order for the Kirby Lumber Company of Houston, Texas. Inquiries and requests for estimates in all departments are numerous and promise to continue so for an indefinite time.

The Vilter Mfg. Company, Milwaukee, say that business has been exceptionally good, although this generally is the season when it is dull in their principal line of manufactures —namely, refrigerating and ice making machinery. Besides having disposed of a number of ice making machines they have furnished complete equipments for breweries and bottling departments. They have run their large works day and night for the past six years or more, and from the present outlook may continue to do so for a long time to come. The larger percentage of their ice making and refrigerating machinery has been sold to breweries. Corliss engines have been sold principally to factories and mills, but one engine is usually furnished with every refrigerating machine sold. The company report collections fairly good, the bulk of their business being in the shape of contracts, for which payments are received from time to time as the work progresses, and the majority of these are made promptly. The outlook for fall and winter trade is very good. The following contracts have recently been closed: Ruston Ice & Fuel Company, Ruston, La., two 15-ton refrigerating machines; Monticello Ice Company, Monticello, Ark., one 15-ton refrigerating machine; Chartiers Valley Brewing Company, Carnegie, Pa., one 15-ton ice tank; G. Wildermuth Brewing Company, Pomeroy, Ohio, one 35-ton refrigerating machine and ice tank; Keokuk Poultry Company, Keokuk, Iowa, one 25-ton refrigerating machine; Monongahela Brewing Company, Clairton, Pa., one 75-ton refrigerating machine with 25-ton ice plant; Monessen Brewing Company, Monessen, Pa., one 50-ton refrigerating machine with 15-ton ice plant; Butler Brewing Company, Butler, Pa., one 75-ton refrigerating machine with 25-ton ice plant; French Market Ice Mfg. Company of New Orleans, La., one 80 gross ton ice making plant; City of Pittsburgh, for City Farm at Marshalsea, Pa., one 12½-ton refrigerating plant; Henry Rahr's Sons Company, Green Bay, Wis., one 25-ton refrigerating machine; I. N. Hagan, Uniontown, Pa., one 2-ton ice making plant; Petoskey Brewing Company, Petoskey, Mich., two orders for brine piping; Midland Rice Milling Company, Midland, Texas, 17 x 42 Corliss engine; Adler & Oberndorf, Chicago, 16 x 36 Corliss engine; Estate of Anson Eldred, Milwaukee, Wis., 16 x 30 Corliss engine; T. J. Gardner, Las Animas, Col., 10 x 15 x 30 tandem compound Corliss engine; Menasha Paper Company, Menasha, Wis., 16 x 36 Corliss engine; Menasha Paper Company, for Ladysmith, Wis., 20 x 42 Corliss engine; Saginaw Valley Traction Company, Saginaw, Mich., 32 x 60 Corliss engine; Wm. Hellman & Co., Milwaukee, Wis., 8 x 24 Corliss engine.

The Nordberg Mfg. Company, Milwaukee, Wis., advise that conditions in the machinery trade, as seen from their standpoint, remain the same as they were the month previous, except that the inquiries for machinery are more numerous and decidedly intensified in the urgency for guaranteed shipments.

Equipment Supplies and Tools.

Chas. H. Besly & Co., Chicago, report general business very good. They are shipping many Gardner grinders to all parts of the country, recent shipments of these machines going to Illinois, New York, Massachusetts, Wisconsin and Pennsylvania. Contracts are being closed with many of the agricultural implement manufacturers for grease cups and Helmet oil. They are receiving many orders from the various shops throughout the country for general factory and mill supplies, and the numerous inquiries for price and information for tools indicate a healthful condition of trade for the future. The company have just let contracts for a new store building on Clinton street, between Randolph and Washington streets. Over 50,000 square feet of surface will be devoted to machinists' supplies, making one of the largest exclusive supply stores in the country.

The Gardner Governor Company, Quincy, Ill., have had a very prosperous month, orders coming in with the same frequency as has characterized conditions the past six months. Orders have not been received from any particular source, but are well distributed, indicating that prosperity extends over the whole country. They will install electric cranes in their factory very soon, and have already added a few machine tools to their equipment.

The Anderson Tool Company, Anderson, Ind., have continued to experience a liberal volume of trade during the month of August, the majority of the orders received being for domestic distribution. Collections have been prompt and otherwise satisfactory.

Hill Tool Company, Anderson, Ind., secured a number of satisfactory orders during the months of July and August for tool holders.

The Stover Mfg. Company, Freeport, Ill., call attention to the fact that business in both special hardware and im-

plement lines is usually slow during the month of August, and the month just passed has developed no special features worthy of comment.

Whiting Foundry Equipment Company, Harvey, Ill., report the trade outlook good. They receive plenty of orders, but experience difficulty in securing material and skilled labor.

The Chicago House Wrecking Company, Chicago, are more than pleased with the number of orders they have secured in all classes of machinery, particularly, however, in complete power plants. They have found the demand very active, especially in the lumber trade, having sold a large number of heavy engines of the slide valve type. Their trade among the electric light and power stations has also been exceptionally good. The principal contracts secured during August embrace plants for large saw mill concerns in the South and a number of engines for increased power for electric light and power stations throughout this vicinity. Their foreign business has not been very brisk. They have, however, taken a number of orders for small plants to be shipped to the Northern States of South Africa. The outlook for the fall trade is very bright; inquiries are running much heavier and buyers seem to be ready to do business at once. Arrangements are being made to increase the machine and boiler capacity considerably by erecting new buildings. Equipment will be of the most modern type of machinery and machine tools, which will more than double the capacity within the next 30 days. They are now negotiating for the purchase of an entire machine shop equipment, which will be of the most modern machine tools. They find that it is necessary to their growing business and with the additional machinery to be installed hope to be able to fill all orders more promptly. They have been somewhat handicapped with labor troubles, but matters have been entirely adjusted and everything is going along smoothly. The company report collections good.

The Philadelphia Machinery Market.

PHILADELPHIA, PA., August 30, 1902.

Trade conditions in the Philadelphia machinery market have been rather quiet during the past month. There has been no lack of work, however, every one continues uniformly busy, but during the vacation season there has been a tendency to postpone for the time being anything except urgent business. A number of manufacturers therefore find a considerable lessening of inquiries, particularly for some standard lines of machines, which can be had just as well a month later as at the present time. With special tools, however, there has been a satisfactory business transacted. From the nature of the inquiries it is said that the prospective business for the fall is large, and with the volume of business already on the books continued activity is assured for a long time to come.

Deliveries, which in cases have improved a little, are far from satisfactory. The bookings of some manufacturers are so far ahead that nothing can be promised until late in the year, while in some cases the time is extended until 1903, this latter being the case in large tools and heavy special machinery. The deliveries on the lighter and standard tools, however, are much more prompt.

Foreign demand drags, and no efforts are being made toward increasing this branch of business, while domestic conditions continue to be as promising as at present. In a few special lines an improvement is noted, but it is only in cases where particularly active work has been done.

Labor difficulties hamper the trade to some extent, the anthracite miners' strike continues, although a few coal washeries are being operated and a small amount of coal is being shipped from the mines, and prices are being maintained at a very high level. It is the opinion of many that some settlement will take place before the end of the present month, and for the interests of manufacturers it cannot come too soon; not only have the latter been affected by the price and shortage of fuel and pig iron, but business activity generally has been curtailed to a greater or less extent.

Iron and steel foundries continue to be rushed with orders, and deliveries on castings have improved but little, if any. Domestic pig iron continues scarce, but foundries have been helped materially by the importation of foreign iron, which it is said mixes fairly well with some domestic brands. The fuel supply has also been quite a factor to some foundrymen, and delays, due to a shortage of one or the other raw material, have not been infrequent, especially among those whose storage facilities are limited.

The demand for machine shop supplies continues active, and deliveries in cases are not as prompt as is desired; it is said, however, that a very satisfactory business has been done during the past month.

The recent advances in prices of tools appear to have had no detrimental effect on purchasers. Figures are being well maintained and continue unchanged.

The Keystone Drop Forge Company are in the market for a punch and trimmer press for drop forgings, quick delivery is wanted and a second-hand tool is preferred. This company have a large amount of work on their books and are running all departments to their fullest capacity. Owing to the delay in obtaining building materials they do not expect to move to their new plant at Chester, Pa., until next spring.

W. A. Shipley reports a very satisfactory trade during the past month. The market has a healthy tone, and indications are very favorable for a good fall trade. Sales of milling machines, planers, drill presses, cold saws and other tools have been made and delivered to various local and nearby concerns.

Thos. H. Dallett & Co. report an active trade in rope driven and electric portable drills, and orders for several of each have been booked. The demand for pneumatic tools has increased and a number have been shipped to various parties. Several stone dressing and carving tools have also been shipped, and from present indications it is expected that the fall trade will be large.

The Philadelphia Pneumatic Tool Company note a large increase in demand for their tools for export, particularly from France; gains in sales have also been made in the home market. Continued improvements have been made to their new plant, and considerable additional machinery will be installed before the first of next year. Some recent orders include a number of tools for the Pennsylvania Railroad, West Philadelphia shops and for the Salt Lake Copper Mining Company, Salt Lake City, Utah, while among the shipments made were 18 Keller chipping hammers and 36 riveting hammers for the Cambria Steel Company, Johnstown, Pa.

I. H. Johnson, Jr. & Co. have completed and are now occupying their new office building at Fifteenth and Carlton streets, and are engaged in extending their erecting shop. Business is reported in good condition; among the orders recently received was for one for three particularly large lathes. All departments of the plant are busy, and a number of tools have been shipped to various parties—two 50-inch lathes, 30 feet bed, for Western parties being among the number.

The Philadelphia Roll & Machine Company will install a new power plant, the present equipment being inadequate for their present needs. They are in the market for a 200 horse-power engine and two 100 horse-power boilers; additional improvements are also contemplated. This company have recently shipped three carloads of rolls to the Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa., and also made deliveries of rolls to the Bethlehem Steel Company, American Bridge Company, Pennsylvania Steel Company, Maryland Steel Company and the Tidewater Steel Company, Chester, Pa. A large number of orders are on their books, and conditions for future trade are considered most promising.

The Espen-Lucas Machine Works, manufacturers of cold saws, are very busy on a various line of their goods, a number of very satisfactory orders have been recently booked, and it is probable that the shop will shortly be operated on double time. They advise us that the Baird Machinery Company, Pittsburgh, Pa., and Marshall, Hushardt & Co., Cleveland, Ohio, have been appointed agents for their line of machines in their respective territory. A number of saws have already been shipped to various local and other parties.

The Falkenau-Sinclair Machine Works have completed the rearrangement and installation of machinery due to the consolidation of the Falkenau and the Philadelphia machine tool interests, and is very busy on a large quantity of work. Orders have been numerous, including one for a 100-ton standard vertical testing machine and one for a 150-ton chain testing machine. Contracts have been signed for three large double crank presses and three small presses, a large lot of hydraulic high pressure valves and a special milling machine for locomotive work. Deliveries have been somewhat delayed during the month owing to the changes in equipment of the plant. A number of presses of various sizes have been shipped for local and other parties. A large cement laboratory testing outfit has been delivered to Southern parties, and file cutting machinery has been delivered to Mayer & Co. of this city.

The Franklin Machine Works, Incorporated, Indianapolis, Ind., recently completed a large order of tools for a Western concern, including one No. 4 and two No. 3 plain slab milling machines, cold saws, grinders, &c. They advise us that inquiries have been numerous, and a good proportion of orders have been taken, including among others a number of milling machines for New England delivery. Shipments of several large tools will be made early next month, and the amount of work on hand is sufficient to keep the plant running full for some time.

The American Pulley Company continues busy, there has

been a constantly growing demand for their line of goods, both from foreign and domestic sources, and business conditions are considered very favorable. This company have just completed the installation of an independent electric light system, and introduced the sprinkler system for fire protection in their plant.

Dienelt & Eisenhardt keep busy in all departments. Inquiries are numerous, particularly in the line of jacks for which many orders are on the books; trade in dead stroke hammers has also been good, and the foundry department is rushed with work. Shipment of jacks are being made daily, and a number of hammers have recently been shipped to various concerns.

The crane department of the Niles-Bement-Pond Company have prepared drawings and specifications, and are asking for bids for a new machine shop, which they hope to have completed by January 1, 1903. This shop is to be three-story, brick and steel, 50 x 225 feet, and will be used for light machine work, gear cutting, &c. A number of tools in their present shop will be removed to the new shop on completion, but many new tools will also have to be purchased to complete the equipment. This addition will give them more space for the erection of cranes, something badly needed at this time. Foundations have also been completed for a new storage building for castings, electrical supplies, &c., of which large quantities are kept in stock. This building will be 25 x 400 feet, all iron construction and 25 feet high to the runways of a crane, which will be installed and have full sweep of the length of the building. A carpenter shop will also be built at one end of this building. Yard facilities for the storage of large quantities of sheared and universal plates, angles, channels, rail, bars, &c., entering into the construction of cranes have been improved, all parts of the yard being served by crane. Orders on the department books are large and a number of cranes are in course of building. Among some of the cranes recently completed have been nine for the American Locomotive Company, one 30-ton and one 120-ton being erected at the Richmond locomotive plant, three 1-ton and two 35-ton capacity at the Schenectady plant, one 10-ton at the Brooks Locomotive Company's plant and one 25-ton at the Rogers Locomotive Works. Two more, one 25-ton and one 100-ton, are also ready for shipment to the latter plant. Five cranes have been erected for the Oregon Short Line Railroad at their Pocatello, Idaho, shops, and six have been erected in the Omaha shops of the Union Pacific Railroad. The cranes for both these companies range from 10 to 100 tons capacity. Three cranes, two 40-ton and one 15-ton, have been completed for the Norfolk & Western Railroad, Roanoke Machine Works, and orders have been booked for seven cranes, from 25 to 50 tons capacity, for the Union Steel Works, Pittsburgh, Pa.; a 100-ton crane for the Meadow shops of the Pennsylvania Railroad, near Brooklyn, and three additional cranes for the Philadelphia & Reading Railroad shops at Reading, Pa. The crane department is running all departments on double time, and conditions for continued activity are satisfactory.

The Eynon-Evans Mfg. Company have increased the facilities of their pattern shop to a large extent, and are now able to handle special pattern work with greater promptness than heretofore. A large amount of pattern work is in course of construction at the time for the Newport News Ship & Dry Dock Company, the Midvale Steel Company and for other parties. The foundry and machine shops are busy on a large amount of general work, some very large condensers being in course of building. A number of their special gas produce blowers have been recently shipped to many of the large steel works and for export to foreign countries.

The Tabor Mfg. Company continue operating their plant to its full capacity. Inquiries have been numerous, and some very good orders have recently been booked, notably three machines for export to England, consisting of two split pattern power ramming machines, 13 x 20 inch and 24 x 24 inch and one 7-inch power ramming vibrator frame machine. Two split pattern machines, 24 x 48 inch and one 24 x 36 inch, will be built for P. M. Sharpless, West Chester, Pa., and one 30 x 30 inch split pattern machine has been ordered by the Commonwealth Steel Company, St. Louis, Mo. A large number of orders for smaller machines have also been received. Recent deliveries include an 18 x 26 inch split pattern machine for Bement, Miles & Co.'s plant, Philadelphia, and an 18 x 30 inch machine for the Westinghouse Electric Company, East Pittsburgh, Pa. The Tabor Company have a large amount of work ahead, and a very satisfactory fall trade is anticipated.

The Energy Elevator Works have during the past month made shipments of various freight and carriage lifts to a number of points, including Shreveport, La.; Madisonville, Ky.; Pittsburgh, Pa. (foundry elevator); Wigville, Ohio; Leesburg, Va.; Houston, Iowa; Urbana, Ohio; Grantsville, W. Va.; Saluisbury, Md.; Houghton, Wis.; Geneva, N. Y.; Chester, Pa.; Evansville, Ind.; Morocco, Ind.; Lynn, N. C.; Endicott, Wash.; Wildwood, N. J.; Rockford, Ill., and a number have also been installed in this city. Trade conditions are reported as most satisfactory, and a large amount of work is on their books.

Activity continues at the plant of the Baldwin Locomotive Works, where a large amount of work is being done toward the improvement of the plant and to facilitate the production of locomotives. A large tract of ground at Twenty-sixth street and Pennsylvania avenue has been recently purchased on which a new supplementary erecting shop will be built, plans for which are now in the hands of their engineers. It is expected that work can be begun on this building about the first of next year. They have also purchased what has been known as the Bush Hill Brewery property on Buttonwood street above Eighteenth street, which will be converted into a storage house for materials. Two hydraulic elevators will be installed at the Broad and the Fifteenth streets ends of Hamilton street, to serve the extra work shipping department, and a number of other minor improvements are being made in various parts of the plant, all of which will increase facilities in their respective departments. For the first six months of the present year the Baldwin Locomotive Works turned out 694 finished engines, as compared with 640 for the same period in 1901, and orders are on hand sufficient to keep the plant running full time well into next year. Some recent orders include 20 locomotives for the Union Pacific Railroad, besides others for Harriman system. Six locomotives, four passenger and two switching engines, are to be built for the Central Railroad of Brazil, which are to be ready for shipment by November 1. Deliveries on orders are regularly being made to the Pennsylvania, Atchinson, Topeka & Santa Fé, Lehigh Valley, Reading, Chicago & Alton, Denver & Rio Grande, and other railroads, while numerous shipments to individual concerns have also been made.

Trade Publications.

Steam Engines.—The Racine Hardware Company of Racine, Wis., make a specialty of the manufacture of high grade automatic vertical engines in the small sizes from 2 to 37 horse-power. They are especially adapted for operating electrical apparatus both direct connected and belted, although they are equally well suited for other uses where uniform power, close regulation and economy are desirable. They are of the piston valve type with extension rings for the valve piston. All working parts are adjustable, and each engine has a substantial sub-base to the floor line with broad outbearing for the crank shaft which is secured to the extended base. Perfect alignment is by this means assured. All these engines are fitted with the Rites inertia governor, and are guaranteed a regulation within 1½ per cent. from no load to full load.

Boring Mills and Cold Saws.—A catalogue by the Franklin Machine Works, Incorporated, of Philadelphia, describes their horizontal tool room boring machine, plain milling machine and several types of their cold saw cutting off machines. In their improved universal cold saw cutting off machine the work table is pivoted, which allows the work to be brought to the near side of the saw. These particular machines are built in three sizes, for 8, 12 and 15 inch I-beams. Their steel foundry saw is intended for small work and is made in two sizes, provided with saws of 21 and 30 inches in diameter, respectively. The automatic feed is variable from ¼ to 2 inches.

Power Transmission Machinery.—Power transmission equipments complete in every particular are furnished by the C. C. Wormer Machinery Company of Detroit, Mich. Their engineering department is in charge of a competent mechanical engineer of large experience in designing and constructing car plants. Their wire rope transmission sheaves are fitted with a rubber filling which reduces wear to a great extent. When so desired these wheels are furnished with friction clutches. They have an extended line of machine molded pulleys from 6 to 64 inches in diameter, there being several different widths of faces for each size.

Wood Working Machinery.—A very complete and handsomely illustrated catalogue has been prepared by the H. B. Smith Machine Company of Smithville, N. J., dealing with their standard and special machines for wood working. H. B. Smith, the founder of this business, built his first wood working machine in 1832. At that time he was engaged in the cabinet making business, and found the machines then patented very crude and inefficient. He made many efforts to have some built according to his own ideas, but failed because of the lack of progressiveness on the part of manufacturers of that class of machinery. As a consequence he made his own patterns, and had the machines built under his own supervision. His success through their use was so decided as to practically compel other wood working establishments to purchase similar machines from him in order to meet competition. Besides adapting his machines for use by power he was the first to construct them with iron frames and generally cast this in one piece. His inventions were many, and include most machines in use today in general planing and sash, door and blind mills. He patented the blind wheel mortiser in 1847; then followed molders, tenoners, reciprocating power mortisers and other types in rapid succession. The present company was incor

porated in 1878, and frequent enlargements have been made to the plant, until at the present time it is probably the largest single concern in the world devoted exclusively to the manufacture of wood working machinery. The catalogue describes every class of machine for the working of wood, and is so large that even an enumeration of the titles alone would occupy columns of our space.

Light Sections and Shapes in Rolled Steel.—The Cambridge Rolling Mill Company, Cambridge, Ohio, have issued a neat 56-page catalogue of the product which they manufacture from Bessemer steel. Lithographic views are given of a great variety of sections of small angles, zee bars, channels, tees, cultivator shapes, harrow bars, plow beam billets, plow channels, barn door and hay carrier track, &c. The contents further include the standard steel classification and tables of weights per foot of numerous sizes of flat, square and round steel. The company design special rolls to produce light sections and shapes.

Vessel Loading and Unloading Machinery, and Coal Storage.—Two large catalogues by the Dodge Coal Storage Company, Nicetown, Philadelphia, present descriptions of their coal storage plants, and also appliances for the loading and unloading of vessels with the aid of machinery. Their revolving locomotive cranes were originally designed for unloading coal and ore in the ports of the great lakes, and have been improved and developed from the exact requirements of that service. They are now strong, simple, symmetrical, easy and accurate in operation and adapted to handle large quantities of material rapidly, continuously and at minimum labor cost. The Dodge Company are the exclusive sales agents of the McMyler Mfg. Company in the New England, Middle and South Atlantic States. This hoisting and conveying machinery has been brought to the highest state of efficiency by the latter company. One very clear engraving shows the transfer of blast furnace slag from the water pit to the car. The slag is run from the furnace into the water which granulates it and so makes it ready for handling by the crane. The pit is of sufficient size to take the slag from the 24 hours run of the furnace. The loading in the cars is done by one man, the crane operator, who handles in 12 hours the entire daily production of the furnace The Dodge system as applied to the handling of coal combines with mechanical simplicity the largest facility and economy yet obtained by appliances of this character. The functions of the system are two—namely, the stocking or trimming out of coal to be stored and the reloading from storage for further transport. Both operations are performed by continuous conveyors. This system has been successfully applied to the storage of anthracite coal on level ground and on hill sides and in both circular and rectangular buildings. Sixteen plants now in operation and under construction have an aggregate storage capacity of 2,210,000 tons. The cost of either stocking out or reloading on an active plant will not exceed 3 cents per ton.

Pipe Threading and Cutting Off Machines.—The Bignall & Keeler Mfg. Company of Edwardsville, Ill., have issued a catalogue describing their line of pipe threading and cutting off machines. Their Peerless No. 3 improved is especially designed for severe and exact service in the cutting of pipe from ¼ to 3 inches and bolts from ½ to 2 inches. The bed is long, giving the carriage a travel of 27 inches, and the chucks and die head are of ample proportion. Their No. 18 machine is intended to thread and cut off standard merchant pipe from 8 to 18 inches. Eight sets of dies are included in the regular equipment, a separate set being furnished for each size of pipe, each set consisting of 12 chasers.

Emery and Corundum Wheels.—The American Emery Wheel Works of Providence, R. I., makers of wheels by the vitrified, silicate, elastic and vulcanite processes, describe their emery and corundum wheels in a catalogue just issued. The company recently moved into their new factory, which was designed and built for the scientific and economic manufacture of these wheels. Many of the machines and appliances were created especially for them. The company possess special testing machines with which any desired speed may be attained, the number of revolutions being accurately recorded by an indicator. Wheels are tested immediately before shipment at a surface speed of not less than 9000 feet per minute, giving them a stress of 250 pounds or more per square inch, thus proving beyond any question that each and every wheel is entirely free from defect or weakness. Since this speed is much in excess of any that the wheel would be subjected to in practice its safety is assured. Their corundum wheels are made from the Craig mine product, which is the purest corundum chemically and physically known, and is next to the diamond in hardness. Many regular and special shapes of wheels are illustrated which have been designed particularly for use on the best known grinding machinery.

Valves, Injectors, Oil and Grease Cups, &c.—A large catalogue by the Lunkenheimer Company of Cincinnati describes their most complete line of brass and iron steam specialties and engineering appliances. Since issuing their last catalogue in 1898 the company have greatly increased their facilities, and expect by the end of this year to occupy new factory buildings which will be unsurpassed by any similar structures of their kind. The Lunkenheimer automatic injector is a simple, durable, efficient boiler feeder, not liable to get out of order, and is fully guaranteed in every particular. It is stated that this injector will deliver more water per pound of steam than any other, which means a direct saving in fuel. The injector can be relied upon to start instantly after a temporary interruption of either the steam or water supply.

Feed Water Heaters and Purifiers.—Kelley's improved Berryman feed water heaters and purifiers are considered in a pamphlet by Benjamin F. Kelley & Son, 91 Liberty Street, New York. These devices meet all the requirements that after an experience of over a quarter of a century have been found essential, and are reliable, efficient and practical. The shell is of cast iron or steel, and as the area is many times greater than that of the exhaust there can be no back pressure. Therefore not being subjected to the boiler pressure the shell cannot leak. The tubes are of seamless drawn brass tested to 1000 pounds hydrostatic pressure before being used. The strain from expansion and contraction is overcome by the U shape of the tubes, both ends being fastened into the base. There is no separate tube sheet. The settling chamber which is inside of and entirely surrounded by the steam jacketed base, which retains the high heat imparted to the water through the tubes, entraps all the impurities, which can be blown off at will.

At Home is the title of a beautiful little pamphlet by the American Blower Company of Detroit, Mich., which presents many most excellent half-tone engravings of different departments of their extensive establishment.

Wrought Pipe and Coils.—The Rempe Company, Chicago, in a substantially bound catalogue, call the attention of the trade which uses wrought iron pipe and iron pipe coils to the fact that the wrought pipe they manufacture is made from refined skelp especially designed for bending, and when bent by special machines preserves the full circle of the pipe. All welding is done by the electrical process. The catalogue not only illustrates the various purposes for which wrought iron pipe is designed, but presents fittings of an improved design, and some of the most modern tools now in service in handling wrought pipe.

Worcester Emery Wheel Company, Worcester, Mass., who recently began the manufacture of emery and corundum wheels in that city, issue a circular describing some of the varieties of wheels now made by them, and giving tables of grades for different classes of work. The circular states that they are not confined to one process, and that they are in a position to furnish special wheels for particular work. Reference is made to the Elastic wheels of which they make a specialty. These wheels are adapted for plain grinding, on soft steel shaft and spindles, steel of low carbon, roll grinding, and can be run in caustic soda.

The Pittsburgh Steel Foundry.

The Pittsburgh Steel Foundry, with offices in the German National Bank Building, Pittsburgh, and works at Glassport, Pa., claim to have the largest single steel foundry not only in the United States, but in the world. Their foundry contains 34,000 square feet of molding space. The main floor, which is 64 x 350 feet, is served by two 25-ton electric traveling cranes. There is another molding floor for lighter castings, which is 33 x 350 feet, served by a 10-ton electric traveling crane. The casting and cleaning department is 64 x 550 feet, equipped with three 25-ton cranes. All these cranes, as well as the three serving the molding floors, are provided with 5-ton auxiliary hoists for the rapid handling of lighter loads.

The casting department is equipped with five 20-ton open hearth furnaces, so arranged that two or more can be tapped at one time whenever a large amount of metal may be required for exceptionally heavy castings, of which this company make a specialty. A producer gas plant was installed, but this is not in use, natural gas being used as fuel on account of its lower cost. The motive power is exclusively electricity, generated by a central power plant. Forty electric motors of various capacities are located throughout the works for operating machine tools, blowers, grinding mills and other appliances. A Wellman electric charging machine is used for charging the furnaces. The officers of the company are: Stewart Johnston, president; J. M. Lockhart, vice-president; Augustus Trump, secretary and treasurer; Duncan McDougall, superintendent.

New Publications.

The Treatment of Steel.—A Compilation from Publications of the Crescent Steel Company. Published by the Crucible Steel Company of America, Pittsburgh, Pa.

This neat little volume, which is largely composed of chapters from Ede and Metcalf, contains a vast amount of information valuable to the user of crucible steel, with the many don'ts which beset his path.

Civil Engineering as Applied to Construction. By Leveson Francis Vernon-Harcourt, M.A., M. Inst. C. E. Publishers, Longmans, Green & Co., New York, 1902.

This book is of value to the profession in two ways. It is a useful work of reference in view of the concise grouping together in a single volume of the various branches of constructive civil engineering, and it is a very desirable work for engineering students in directing their attention to the principles forming the basis of design and construction in civil engineering, by indicating the ways in which these principles have been applied in actual practice.

The magnitude of the work, the preparation of which has extended over several years, may be understood when it is stated that it is an octavo volume of 624 pages, with 368 illustrations and four tables. Of the illustrations it may be said that they are all line cuts, drawn as far as posssible to simple fractional scales easily comparable with each other, so that some sort of approximate idea of the relative sizes of different works given may be had. The index is encyclopedic in form, occupying 58 pages; for example, under the head of mountain railways over 33 distinct references are given. To a student seeking information in any one department such an arrangement cannot fail to commend itself.

In Part I materials, preliminary works, foundations and roads are considered. Part II takes up railway, bridge and tunnel engineering. There are 13 chapters, in the first of which the laying out and formation of railways are dealt with. When elucidating the subject of ruling grades the author gives a mass of information concerning the maximum grades on various railways in different countries. Two of the steepest grades in the world appear to be that in the Kickinghorse Pass on the Canadian Pacific Railway, which is 1 in 23½, and one on the Denver & Rio Grande, which is 1 in 25. The limits of curvature and the compensation of gradients for curvature are set forth with examples drawn from a very wide range.

Among the examples of girder railway bridges are given the Saltash Bridge over the River Tamar, the Ribinsk Bridge over the Volga, the Cincinnati Southern Railway Bridge over the Ohio, the Covington & Cincinnati Railway Bridge over the same river, and the Canadian Pacific Railway Bridge over the St. Lawrence at Lachine. Curiously enough, this last is the bridge used by the Standard Dictionary as an illustration of the cantilever type. The classification in the technical work before us is perhaps preferable, because the channel spans are no doubt continuous with regard to the line load, but act as cantilevers with regard to dead load. Among the cantilevers are the Forth Bridge in Scotland, the Poughkeepsie Bridge over the Hudson, the Memphis Bridge over the Mississippi, the Niagara Bridge built by the Michigan Central Railroad, the Sukkur over the River Indus, and the Jubilee Bridge over the Hugli. These examples are given to show that our author has not confined his observation to any one country or any special set of conditions. Various kinds of swing and bascule bridges are illustrated and these are followed by the consideration of viaducts and tunnels. Under the latter head American practice in timbering tunnels is referred to, while the progress and cost of Alpine tunnels ends the chapter. Metropolitan railways brings up the subject of tube and overhead railways, in which the construction of the Manhattan Elevated, the Brooklyn Elevated and the Liverpool Overhead are illustrated. Light railways, mountain railways, in which the practice in New Zealand and Switzerland are prominently mentioned, cable railways and tramways bring the comprehensive second part of the book to a close.

Part III deals with river and canal engineering and irrigation works. In this subdivision of the work floods and the control and regulation of rivers are taken up. When dealing with the important work of canalization of rivers the work done on the River Main in Germany is shown and the Suresnes Lock on the Seine is illustrated. The function of weirs is to retain water in a river during the dry season and of converting it into a series of nearly level reaches, forming, as it were, a set of steps, the differences in level being surmounted in each case by a lock. For instance, the well-known weir on the Thames about 19 miles above London is a typical example of draw door construction. Teddington weir has a total length of 480 feet, and the central half of the river is closed by plate iron doors 6 feet high and 7 1-3 feet wide, sliding in grooves at the sides of iron frames. Just here it may be of interest to mention that Professor Huxley asserts that the name Teddington is said to be a corruption of "Tide-end-ton," the town where the tide ends, as above this weir the effect of the tide on the River Thames ceases to be felt. When speaking of the improvement of river outlets the jetties at South Pass outlet of the Mississippi are illustrated, as well as those on some of the noted European rivers.

Part IV deals with dock works and maritime engineering. This includes river quays, basins and docks, dock entrances and locks and graving docks, harbor works, lighting coasts and channels, land reclamation and coast protection. This latter is, of course, understood in the civil engineering and not in the military sense.

Part V is concerned with santitary engineering and takes up in four chapters the sources and storage of water supply, conveyance and distribution of water supply, sewerage works and the disposal of sewage.

In reading the many interesting and instructive paragraphs which this most comprehensive work contains one is struck by the fact that, although the dates of the great undertakings mentioned are generally given, the name of the engineer with whom the work is inseparably associated is in no case recorded. It seems, however, that desirable as this information would certainly have been, the author is here describing existing works, materials and methods, and not men. In thus impartially leaving out the names of famous or successful engineers we may miss a pleasure, but the author has not been compelled, in recording the partial failures of some engineering structures, to couple with them the names of workers who may have been sorely tried or defeated in the struggle with the forces of nature which all engineers have to face. Mr. Vernon-Harcourt has given to the engineeering profession a most extensive, valuable and easily compared record of works accomplished in the wide field of civil engineering as applied in construction.

D. H. Miller and William Deal of Folsom, Delaware County, Pa., are the representative patentees of a magnetic brake for use on trolley cars. The brake, like others, is under the control of the motorman. It is arranged on each car in the form of a plunger. This plunger, when a separate current from that operating the car is brought into use, is forced into a boxlike arrangement, and the action draws the brakes. The apparatus used to work the device is a small controller on the motor. Several trials have been made, and each time the car at a high rate of speed was stopped in two-thirds of its own length.

It was officially announced at the headquarters of the Amalgamated Association in Pittsburgh last week that the proposition submitted by the American Tin Plate Company for the tin plate employees to accept a reduction in wages on tin plate for export had been defeated. A number of lodges that at first voted almost solidly against the proposition reconsidered their action and voted in favor of it, yet there were not enough of these to change the general result.

HARDWARE.

THE question of trade protection would seem to be rather a simple matter as between a jobber and a retailer. The jobber builds up his business by cultivating the patronage of the retail trade. It matters not what other fields he may invade, as from none of them, and indeed not from all of them combined, would he receive sufficient trade to entitle him to a place as a Hardware jobber. Railroad trade may be of enough importance to claim the attention of a special salesman, local manufacturing development may be large and varied enough to warrant a specialist to look after it, or a retail department may be a profitable adjunct, but it is absolutely necessary to have the trade of a large number of retail dealers. The interest of the retail dealer being the essential element should be conserved above all others by those who assume to conduct a jobbing business. This is the rule which should be laid down for the government of a jobbing house, and if it were carefully and rigidly followed would eliminate the friction which exists in too many sections. Representatives of jobbing interests freely acknowledge their dependence upon the retail trade, especially when some occasion demands a public utterance on the subject, but that they too often disregard the obligation resting on them of observing the rights of their best customers is shown by the charges brought against them whenever the relations of jobbers and retailers come up for discussion.

Frequent allusion is made at meetings of retail Hardware State associations to the benefit derived from local associations. Sometimes it has happened that local associations have sprung from the State gatherings. Dealers from the same locality happen to be brought into closer contact with one another than ever before, and it is then an easy matter to continue for local benefit the interchange of opinion and the comparison of views inculcated at the State assemblage. Some local associations, however, sprang into existence spontaneously, as it were, with no State movement as an inspiration, but purely as an expression of the desire of level-headed dealers to get together for mutual benefit. It is the universal testimony of those who belong to these local associations that they have been productive of excellent results. Men who for years had regarded each other with bitter hostility, and turned willing ears to bearers of stories about the tricks of the dealer down the street, learned to their surprise after making his acquaintance that he was not much unlike themselves. Very probably after a half hour's talk it was discovered that a misunderstanding about local conditions had caused some prices to be marked altogether too low for the good of their respective bank accounts. In some instances dealers have confessed to conducting stores in the same town for twenty years or more without trying to get acquainted with each other and believing all kinds of fables about the other's methods of bidding for trade and sacrificing profit. These very men, after becoming acquainted, are not unwilling to help each other out when one runs short of stock or to unite in purchasing quantities of goods to secure better discounts. We are in receipt from time to time of letters from our retail Hardware friends regretting that more attention is not given to the important question of getting local competitors together. It is a very important matter, sufficiently so to have a permanent place on the programme of every convention of a State association. Even if there are only two dealers in a locality competing for trade, those two dealers should by all means get together and understand each other. It would mean not only additional dollars in their pockets but great benefit in other directions.

Condition of Trade.

With the vacation season practically over and the entrance on the fall months a quickening in business throughout the country is to be anticipated. Summer has given manufacturers less than the usual opportunity to accumulate stocks. In many lines they have been working on orders from which their books are not yet entirely cleared. The necessity for repairs and the regular overhauling of plants has of course interfered somewhat with production, and strikes and the difficulty in obtaining materials and fuel have also tended to reduce to no inconsiderable extent the quantity of goods available for the trade during the coming months. While there is a scarcity in some lines the jobbers are unquestionably well supplied with goods for the fall trade and some reports indicate that their stocks are unusually heavy. The goods in warehouses in connection with those ordered certainly show by their volume that a large business is anticipated. Owing to these conditions the demand upon the manufacturers and their representatives has been of late somewhat quiet, but it is now beginning to quicken. Prices are, as a rule, steady and strong. A few lines, owing to special conditions which affect them, are giving indications of slight weakness, which do not, however, cause any disquietude among the trade, who recognize the desirability of a gradual lowering of values rather than a sudden collapse in lines which are unreasonably high. While it is regarded as certain that there must come sooner or later a material decline in values, the date at which it will take place is being pushed further into the future by those who thought it might come during the season on which we are entering. In view of the more than satisfactory crop conditions, when the country as a whole is considered, and the prosperity which prevails among the people in practically all sections, the outlook for business during the next few months at least is exceedingly promising.

The following letter from a gentleman thoroughly familiar with trade in the West and Southwest will be read with interest as reflecting crop conditions in the territory to which it refers:

Western Tennessee, Northern Mississippi, Arkansas and Oklahoma and Indian Territories have promise of harvesting a maximum crop of cotton—almost, if not quite, as large as any time within ten years. As a consequence trade in all lines is brisk at Memphis, Little Rock, Pine Bluff and Fort Smith. Railroad construction throughout the Territories, together with a fair wheat and corn crop and promise of a good cotton yield, is making trade exceedingly lively here, though I find stocks in the hands of the jobbers larger than I have ever known before.

In North and Central Texas they seem to be waiting the results of the next few weeks with considerable anxiety. Very little wheat and corn was raised, the heavy rains in June coming too late to be of benefit to either. Cotton, however, took on a rank growth, causing the plant in some instances to attain a hight of 8 to 10 feet. As a result the lower bolls decayed and fell off before maturing. The central bloom was destroyed by the boll worm, which in turn has been destroyed by excessive heat. The top is blooming nicely, and as it is generally conceded that all cotton blooms will mature which bloom by September 10 they still have a prospect of a bountiful crop. Rain is needed in some sections, but it looks to the writer as though they will produce

all the cotton that they will be able to get picked by January 1 next, as labor is quite an item in this section.

To sum up, I cannot see that this country has any kick coming.

Chicago.

(*By Telegraph.*)

The increase in the volume of business in jobbing lines has been well maintained, there being a steady flow of new orders and increased distribution on contracts previously placed. This extends throughout all lines in Heavy and Shelf Hardware as well as in specialties. The increased movement is most conspicuous in heavy lines, such as Tin Plate, Steel Goods, Miners' Tools and Blacksmiths' Supplies. In Cutlery, Axes and Tools the shipments are of larger size and more frequent. Larger duplicate orders are being received for Builders' Hardware also.

St. Louis.

(*By Telegraph.*)

The month just closed was productive of some very gratifying conditions, and the jobbers are unanimous in their approval of the present state of the buying movement. September has opened up with the active conditions well sustained and indications point to a very strong demand during the fall months. All classes of fall and winter supplies are in urgent demand, and this applies most especially to everything in the line of Stove goods. The demand for Builders' Hardware shows an especial increase, and it is reported sometimes difficult to get a complete supply from the manufacturers. Building operations are quite extensive now, and with the commencing of the contemplated additional plans in this line the call on the Hardware market will be heavy, and unless supplies become more liberal it will be difficult to fill requirements. The disposition of the dealer to reorder frequently proves that stocks on the shelves are being kept quite complete and our jobbers have not been amiss when placing liberal specifications with the manufacturers for their supply and so are prepared to meet all calls with promptness. Business in the heavy department of the market shows increasing volume and conditions generally are considered satisfactory.

Louisville.

W. B. Belknap & Co.—The market shows no signs of weakness, though there is nothing exciting, as arrangements for fall supplies have doubtless been made long before this.

The mills seem to be running in pretty good shape. The main trouble now is with delays in transit. The railroads seem woefully deficient in motive power and equipment. We know of cases where cars have taken five weeks to get 600 miles away from Pittsburgh. A number of accidents have unhappily occurred in this neighborhood, and generally speaking these are double headers, smashing up two locomotives besides making general wreckage of the cars. Just such accidents have occurred within the last two weeks on the Southern and on the L. & N. The jobbers are almost as much concerned over these disasters as the railroads themselves, because the former are dependent on the prompt service, which cannot be rendered when the road is blocked. The engines, too, which ought to be doing their full duty, are practically lost, except to the scrap heap.

We believe that the present volume of business will not only lead to great improvement in the equipment of roads, both as to double tracking, &c., and to the number of cars and locomotives, but as well to the opening and development of new routes altogether. The country has burst its waistcoat, so to speak, another time. We have got to construct a new suit of clothes to fit our growing boy. It will be quite a job of tailoring to get these up in the most approved shape and will take some years to do it.

Nashville.

Gray & Dudley Hardware Company.—The month of August made a very satisfactory showing in comparison with the same month for the past few years. The volume of sales was a little bit larger, and, while the margin of profit is possibly smaller, the class of goods that was sold was fully up to the average or perhaps better. A large amount of Cutlery, Guns, Sporting and Athletic Goods and Shelf Hardware was shipped out by the jobbers during the month.

The prospects for September and the following months are exceedingly good. Some weeks ago there was serious apprehension of a drought in portions of the South, but there have been general rains throughout the Southern States and the crop conditions are now flattering.

A large amount of construction work of all kinds is going on in this city and immediate vicinity. Labor is hard to obtain and is being paid better wages than ever before.

The credit men of the different wholesale houses report collections in very satisfactory shape.

Portland, Oregon.

Corbett, Failing & Robertson.—How many of your readers, when they saw by the morning papers the effect of J. Pierpont Morgan's safe arrival in New York from Europe on Wall Street and stocks, thought of what the effect would have been on Wall Street, and ultimately on business, had the steamer gone down with all on board instead of safely making her port? The time will come, sooner or later, when he or some other sustaining power will go down and then get out from under if you can.

Trade in general is holding its own, considering the season, and when farmers are through with harvesting should show a marked increase in volume.

NOTES ON PRICES.

Wire Nails.—An increase in demand is noticeable in some degree, although not to any very great extent. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots	$2.05
To jobbers in less than carload lots	2.10
To retailers in carload lots	2.10
To retailers in less than carload lots	2.20

New York.—No reduction in the price of Wire Nails in this market was announced the first of the month, notwithstanding the rumors which were circulated to that effect. Prices are maintained at the following quotations: Single carloads, $2.20; small lots from store, $2.25 to $2.30.

Chicago, by Telegraph.—There has been a more active demand and the market has remained steady, with sales of single car lots at $2.15 to $2.20 and of small lots from store at $2.25 to $2.30.

St. Louis, by Telegraph.—Increasing demand for Wire Nails is reported in this department of the market. Prices are unchanged and carload lots are quoted at $2.25, and small lots from stock $2.30.

Pittsburgh.—Demand for Wire Nails shows little, if any, improvement, orders being mostly for small lots. Many jobbers still have Nails due them on contracts placed when Nails were lower in price than they are now and are still specifying on these. We quote Wire Nails in carloads at $2.05, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, but it is reported that in exceptional cases this price is sometimes slightly shaded, about 3 to 5 cents a keg.

Cut Nails.—Prices ruling during August were reaffirmed for the month of September by the manufacturers at a meeting held last week. It was the opinion that the cost of raw material did not justify any reduction in price of Nails. Quotations are as follows: $2.05, base, in carloads, and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—The local demand is confined almost entirely to Steel Cut Nails and that is moderate. Quotations for carloads and less than carloads are as follows:

Carloads on dock	$2.18
Less than carloads on dock	2.23
Small lots from store	2.30

Chicago, by Telegraph.—The demand is increasing for both Iron and Steel Cut Nails, with local supplies scarcely adequate. Carload lots are quotable at $2.20, base, and $2.30, base, in a jobbing way from store.

St. Louis, by Telegraph.—Cut Nails continue in fair demand, and for small lots from jobbers' stock $2.40 is asked.

Pittsburgh.—August prices of Cut Nails for September delivery were reaffirmed at a meeting of the Cut Nail Manufacturers' Association, held on August 28. There is a fairly good demand for Cut Nails and occasionally some trouble is experienced in getting prompt delivery, owing to freight congestion on the railroads. We quote Cut Nails at $2.05, base, in carloads and $2.10 in less than carloads, plus freight in Tube Rate Book to point of destination.

Barb Wire.—The market continues quiet, with a limited demand. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days:

	Painted.	Galv.
To jobbers in carload lots	$2.60	$2.90
To jobbers in less than carload lots	2.65	2.95
To retailers in carload lots	2.70	3.00
To retailers in less than carload lots	2.80	3.10

Chicago, by Telegraph.—Larger orders and more prompt shipments have been the record of the week, the market remaining steady, as previously quoted. Galvanized sells at $3 to $3.05 and Painted $2.70 to $2.75 in car lots, with 5 cents extra for small quantities from store.

St. Louis, by Telegraph.—A better demand is being felt for Barb Wire and firmness in prices is the rule. Painted at $2.90 and Galvanized at $3.20 in small lots from jobbers' stock.

Pittsburgh.—There is very little doing and some of the mills are short of orders. Prices are only fairly strong and are slightly shaded in exceptional cases. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.60; Galvanized, $2.90; less than carload lots, Painted, $2.65; Galvanized, $2.95.

Plain Wire.—The market is quiet with no increase in demand to report. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots	$2.00	$2.40
To jobbers in less than carload lots	2.05	2.45
To retailers in carload lots	2.05	2.45
To retailers in less than carload lots	2.15	2.60

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	Base				$0.40	extra.
10	$0.05	advance	over	base	.40	"
11	.10	"	"	"	.40	"
12 and 12½	.15	"	"	"	.40	"
13	.25	"	"	"	.40	"
14	.35	"	"	"	.40	"
15	.45	"	"	"	.75	"
16	.55	"	"	"	.75	"
17	.70	"	"	"	1.00	"
18	.85	"	"	"	1.00	"

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—There has been a fair order trade. The market has remained steady. Car lots are quoted at $2.10 to $2.15 on track, and the jobbing demand is met at $2.20 from store.

St. Louis, by Telegraph.—The moderate demand and inquiry for Plain Wire has kept up and jobbers continue to quote in small lots from stock No. 9 at $2.25 and Galvanized at $2.65.

Pittsburgh.—There is only a fair demand, orders being altogether for small lots. Prices are not as firm as could be desired, and are sometimes shaded. We quote Plain Wire at $2, base, and Galvanized at $2.40 in carloads, f.o.b. at mill.

Galvanized Ware.—A revision of prices has recently been made by manufacturers of Galvanized Iron Ware, and as a result a number of advances are reported. Pails are quoted $1 per gross higher, and on Washtubs an advance ranging from 25 to 50 cents per dozen has been made.

Scythes.—The manufacturers of Scythes, who have been working in harmony for some time, have agreed upon a uniform schedule of prices for next season, which may be in a general way referred to as about 50 cents advance on the prices for the season just closed. To this agreement all the principal manufacturers are parties, and it is anticipated that an even market will be secured unless new competition not now in sight develops. It is thought probable that prices will be well maintained and perhaps advanced, especially if the plans that are under consideration looking to the consolidation of the Edge Tool interests are carried into effect.

Steel Goods Consolidation.—The trade are awaiting with interest further information in regard to the plans of the American Fork & Hoe Company, who include the principal manufacturers of Steel Goods. No announcement has yet been made in regard to their policy or prices for next season, but it is anticipated that about the 15th inst. these will be made known to the trade.

Wrought Washers.—An advance of 20 cents per 100 pounds has recently been made in the price of Wrought Iron Washers.

Sash Weights.—The condition of things in the Sash Weight market in the East is represented by the fact that an advance of $2 per ton has recently been made in the New York market, the price now being $25. Stocks in all the foundries are represented as low. The scarcity of fuel and the high price of raw material is the cause assigned for the higher prices now ruling in this line. The harmony which exists between the manufacturers is also an important element in the situation.

Cordage.—There is a slight improvement reported in the demand for Rope, which the manufacturers hope will have a steadying effect upon the market. Prices are irregular, owing to the lack of orders, also to the various mixtures which are on the market as Sisal and Manila Rope. Quotations range, on the basis of 7-16-inch and larger, from 9½ to 10 cents for Sisal and from 12½ to 13 cents for Manila Rope.

Glass.—Reports indicate that further steps are being taken with a view to harmonizing the Window Glass interests with a possibility of success. Locally, business is very dull, as buyers are averse to placing orders until future conditions of the market are settled. The Jobbers' Association quotations are as follows for single and double strength Glass:

	Discount.
From store	88 and 5 %
F.o.b. factory, carload lots	89 and 5 %

Paints and Colors.—*Leads.*—The consumption of White Lead in Oil has been good during August, owing to the amount of indoor work that has been under way. Indications point to a continued demand for the fall. Quotations are as follows: In lots of 500 pounds or over, 6 cents per pound; in lots of less than 500 pounds, 6½ cents per pound.

Oils.—*Linseed Oil.*—The resale Oil being offered is having a depressing effect upon the market. Holders of this Oil seem fearful of a further decline in prices and are closing out their holdings at a loss, the figures obtained in some instances being 2 to 3 cents below present quotations. These conditions, together with an estimated crop of new seed of over 30,000,000 bushels, are calculated to cause a further reduction in prices. Quotations for regular goods are as follows: City Raw, in lots of five barrels or more, 60 cents; in lots of less than five barrels, 61 cents per gallon; out of town Raw, 58 to 60 cents per gallon, according to quantity.

Spirits Turpentine.—The market for Turpentine has been quiet, owing to the fact that less buying is always done the last week of the month, and to the firm position of values in the South. Purchases were confined to small lots in the local market. An increased activity is apparent this week with demand for small lots more numerous; also inquiries from large consumers. Quotations, according to quantity, are as follows: Southerns, 47½ to 48 cents; machine made barrels, 48 to 48½ cents per gallon.

DEATH OF CLEMENT M. BIDDLE.

CLEMENT M. BIDDLE of Lansdowne, Pa., formerly treasurer of the Biddle Purchasing Company, New York, Philadelphia and Pittsburgh, died August 27. Nine days previous he underwent an operation for appendicitis. For several days his condition was very favorable for recovery, but a turn suddenly came for the worse and death resulted.

Mr. Biddle, who was in his sixty-fourth year, was the eldest son of William C. Biddle, one of the founders of the Biddle Hardware Company, and was associated with that house for many years, having been its head for a few years prior to his retirement. Subsequently he became largely interested in a combination of manufacturers of gas fixtures, which was one of the earliest of the trade combinations known as "trusts," and whose collapse entailed heavy losses upon Mr. Biddle and his associates. He was also formerly largely interested in the manufacture of Wire Nails and in other enterprises.

In 1878 he founded the firm of Clement M. Biddle & Co., in the management of which he assumed the chief responsibility. This firm were incorporated in 1893 as the Biddle Purchasing Company, and the deceased served as its treasurer and supervised the financial end of the house until ill-health compelled him to retire from active business in 1898.

Mr. Biddle was one of the active and prominent members of the Race Street Meeting of the Society of Friends and was one of the founders and managers of Swarthmore College. During the Centennial in 1876 he was a member of the Finance Committee of the Exposition and later was made president of the permanent exposition that followed.

Mr. Biddle was greatly interested in Darby (Pa.) township affairs, especially in the roads. He was elected road supervisor on a platform that advocated the building of stone roads, and he inaugurated that great improvement in that section of the county. To this Mr. Biddle contributed largely of his own means along with others, with the result that when he relinquished the position many miles of Darby Township's highways were converted into good stone roads. His work was so satisfactory that he was considered an authority on road building.

Mr. Biddle was foremost in the movement several years ago to rid Darby of all saloons and was one of the originators of the Darby Home Protection Society. He was a man of strong character and with a decisiveness about him that made his words and arguments impressive. He was beloved by those who knew him intimately and will be mourned by a multitude of friends and acquaintances. He is survived by a widow, three sons and three daughters. These are William C. Biddle, Robert Biddle, Jr., Clement M. Biddle, Jr., Mrs. J. Reece Lewis, Mrs. J. Lawrence Lippincott and Miss Lydia Biddle.

TRADE ITEMS.

J. C. PAUL & Co., manufacturers of Polishes and Enamels, now occupy offices at 57 Dearborn street, Chicago. Formerly the offices were located on Randolph street. The factory still remains, as in 1887, on Roscoe street. The firm announce that the full capacity of the manufacturing and shipping departments has been taxed to keep pace with the orders received during the season. The firm manufacture nine specialties in liquid and paste form, but among the Polishes designed specially for metals they call special attention to their brand of "Burnishine," which is said to contain no acids or chamicals injurious to any metal or to the hands.

N. S. FULFORD HARDWARE COMPANY, Washington, N. C., have increased their capital stock to $53,000 paid up. They will put three travelers on the road for the jobbing department of their business, who will cover eastern and central North Carolina. They have just completed a three-story and basement brick building on Main street, 45-foot front and with a depth of 200 feet, giving them 30,000 square feet floor space. It is provided with the modern improvements, including electric lighting, steam elevators, &c.

HIRSCHI & KNEVEL, Guthrie, Okla., have bought out the Oklahoma Hardware Company, Oklahoma City, and moved their stock to Guthrie, and have also purchased the business and stock of E. L. Hirschi.

MONTANA HARDWARE COMPANY, Butte, Mont., have recently bought out the Hardware and House Furnishing department of the Bee Hive in that city. For the better accommodation of their large and extended business they are erecting a new store with a warehouse which will be exceptionally complete and admirably arranged. Emil H. Renisch, the manager of the company, is at present in New York.

THE WILLIAM HENRY & R. E. BELL HARDWARE COMPANY have been incorporated at Fort Worth, Texas, with a capital stock of $85,000. The incorporators are R. E. Bell, Robert F. Bell, J. B. Burnside and A. F. Roe. This company will succeed the William Henry & Co., at Fort Worth, and a portion of the business of R. E. Bell Hardware Company at Weatherford will be moved to Fort Worth.

THE AMERICAN BICYCLE COMPANY.

AFTER a threatened receivership which has been anticipated for some weeks, R. L. Coleman, the president of the company, on September 2 announced that proceedings had been initiated to place the company temporarily in a receivership for the purpose of reorganizing its affairs. The announcement was postponed until after the company had defaulted the semi-annual interest coupons of its 5 per cent. sinking fund gold debenture bonds, which became due September 1. There have been rumors of such an outcome in the financial district for some time and several meetings of the company's directors have been held to consider the situation. The collapse is attributed entirely to an inadequate working capital, which the officers of the corporation say has crippled them from the start. The business of the company is said never to have been better than now in its various departments.

Since the issuance of the official statement given below two receivers have been appointed by Judge Kirkpatrick of the United States District Court of New Jersey—viz., R. L. Coleman and Col. Albert A. Pope. The company's statement is as follows:

Interest on this company's debenture bonds, due this day, will not be paid at this time.

Proceedings have been instituted looking to the appointment of a temporary receiver or receivers, in the interest of bond and stockholders, and a plan of reorganization will be submitted at an early date for their approval.

The moving reason for this course is that the company are, and have been since their organization, hampered by lack of working capital; and it is confidently expected that the proposed reorganization will furnish the necessary funds for the proper conduct of their business.

The company are perfectly solvent, and undoubtedly have an assured future. They control about 70 per cent. of the Bicycle output, an increasing and profitable Automobile business (in electric, gasoline and steam vehicles), and a growing and promising trade in Storage Batteries, for all of which they are exceptionally well equipped.

Radical economies have been effected in management and operation, and all old and carried over Bicycle merchandise disposed of. The company have adjusted themselves to new trade conditions wherein the Bicycle has become a staple commodity and the demand a constant and measurable quantity. With the contemplated increase of working capital their success is not in doubt.

The American Bicycle Company are now a holding company of the stocks of American Cycle Mfg. Company, International Motor Car Company, Federal Mfg. Company, and National Battery Company and others.

None of the four subsidiary companies will be affected by the fact that the parent company have been placed in the hands of a receiver. All are in good condition, and what assistance they need will be rendered by the receivers of the American Bicycle Company, or the bondholders in interest.

There is no occasion for alarm upon the part of any creditors of the above named constituent companies. It should be stated that those most largely interested in the company's securities are working in entire accord and harmony upon the lines indicated.

BARGAINS AND PERSONAL POPULARITY.

BY GARIC.

The increased competition of recent years has resulted in a necessarily closer attention to the business methods in the Hardware store. Buying must be done more carefully than formerly; economics in store management practiced; and a matter of equal, if not greater, importance—goods must be sold.

What things attract a customer? Price, quality and good treatment. Low prices bring many customers into a store. Some will be regular bargain sharks, and others persons who may become good customers, and who have been attracted by the bargain. Almost everybody likes to get a bargain, for it generally flatters the vanity to think that one has gotten something cheaper than it should be, and cheaper than the Hardware dealer will want to sell the same article to-morrow.

Low Prices and the Bargain Shark.

The bargain shark delights in buying at a below cost price. He—generally she—is just as well satisfied with a supposed cut price as if the article were really cheap. The bargain shark is of but little use to the Hardware dealer, for he will leave him to buy elsewhere to make a saving of 3 cents on a bill, though it may cost him 5 cents extra carfare and an hour's time to reach the other store. He may make some purchases, and the dealer with the same shrewdness as the shark will frequently present "bargains" at which the shark will bite, but which will yield a long profit.

Good buying by the dealer and the use of a little judgment will result in the finding of many bargains, which will be attractive to the customer, and yield the dealer at least a fair profit.

Bargains Attract Good Customers.

A customer far more desirable to obtain is the one attracted by a bargain, partly because he wants the article, and partly because he enjoys the gamble of buying a cheap thing. If he finds that he has bought an article of inferior quality, or has been stuck, he does not care much, but thinks it serves him right. A man of this kind usually makes a good customer, for he appreciates quality, and will pay the right price for it. If the bargain shark buys an article which proves inferior, he will probably advertise among his friends that the Blank Hardware Company sold him a poor Stew Pan or something else, but he always neglects to add that he paid a poor price for it, or that he received a fair value for the money.

Quality Brings Best Customers.

Quality attracts many of the best people. The people who buy largely of good quality usually pay their bills and stick to the firm treating them fairly. They appreciate quality and good treatment, and are willing to pay for it. These are the people who want what is right, and who expect to have the right price charged. If properly treated, they form one of the best and most loyal classes of trade which the Hardwareman can secure. Other things being even, the members of this class will generally trade at the store carrying the most complete stock. With price, quality and service as good in one place as the other, a buyer will usually go where he can select from the largest assortment, or to the store which is fortunate enough to have the reputation of always keeping everything that is needed.

Personal Popularity.

Personal friendship is a strong magnet to attract trade. It is of value to get custom, but is of more worth to hold trade. Being an equally good business man, the proprietor who is genial and popular, and in whose judgment and word his customers feel implicit confidence can be placed, will succeed every time against the man not possessing these qualities.

It is not necessary that the proprietor alone be liked by customers, for the public judge the store by the treatment they receive in it. For this reason it is essential that the clerks possess the qualities just described. Perhaps it is more necessary for the clerks to be popular than the proprietor, for in many stores they are the ones who come in contact with the customers.

Good Help Should Be Selected.

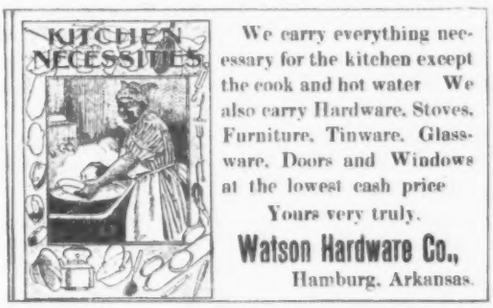
The wise employer selects good help. A proprietor is prefectly free to choose the clerks he desires. If he keeps a disagreeable and uncivil clerk the customers hold him responsible for it, and judge the proprietor, in a measure, by the clerks—his representatives.

Good clerks can always be obtained, and generally cost no more than the poorer clerk. It simply takes a little more time and trouble in making the selection, but one is many times repaid for this extra effort. The clerk who is liked will make friends, and will sell more goods than his less popular associate.

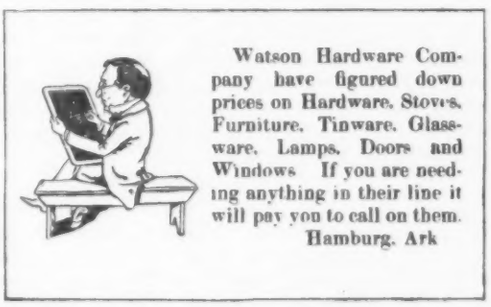
There are stores so situated that a certain amount of business goes to them, because they are the most convenient stores for customers to reach. Others control trade simply because they carry in stock some goods which cannot be readily secured elsewhere. No store should expect to win lasting success without having secured the friendship and respect of its community. Competition will surely come sooner or later, and will be apt to down the store where proprietor and clerks are not liked. The friendship of a community cannot be secured after the new store has started. A store should be so well kept and should be so well liked by its patrons as to leave no room for competition.

THREE POSTAL CARDS.

The three postal cards illustrated herewith, reduced in size, show one way in which the Watson Hardware Company of Hamburg, Ark., remind their customers of


KITCHEN NECESSITIES
We carry everything necessary for the kitchen except the cook and hot water We also carry Hardware, Stoves, Furniture, Tinware, Glassware, Doors and Windows at the lowest cash price
Yours very truly,
Watson Hardware Co.,
Hamburg, Arkansas.

their existence. They are also calculated to impress the recipients with the variety and comprehensive line of


Watson Hardware Company have figured down prices on Hardware, Stoves, Furniture, Tinware, Glassware, Lamps, Doors and Windows If you are needing anything in their line it will pay you to call on them.
Hamburg, Ark

goods which may be purchased at this store. These and similar cards have been sent out by the company from

We have a full stock of Guns, Ammunition, Loaded Shells, and prices low down. We also have a full line of Furniture, Stoves, Doors and Windows, and invite you to call and get prices.
Yours truly,
WATSON HARDWARE CO.,
HAMBURG, ARK.

time to time with good results. The illustrations convey an idea of one of the uses which *The Iron Age* advertising cuts can profitably be put to.

PRICE-LISTS, CIRCULARS, &c.

THE SAMUEL WINSLOW SKATE MFG. COMPANY, Worcester, Mass.: Skates. A descriptive price-list 1902-3, devoted to the large and varied line of Ice Skates manufactured by them. Particular attention is being given this year by the company to Hockey Skates, new styles of which are shown.

WINTER BROS. COMPANY, Wrentham, Mass.: Thistle brand of Taps, Dies and Die Stocks. An illustrated catalogue and price-list is devoted to these goods.

BROWN MFG. COMPANY, Zanesville, Ohio: Illustrated catalogue No. 29 of the Brown One and Two Horse Wagons for farm and general use.

W. H. MULLINS, Salem, Ohio: The Evolution of the Boat is the title of an artistic circular illustrating and describing stamped metal Canoes and Boats.

THE WHITELY EXERCISER COMPANY, Chicago, Ill.: Booklet devoted to the use of and results obtained from the company's Exerciser. Enlarged copies of the colored covers will be furnished by the company, in the same style of printing, for poster use.

EAGLE LOCK COMPANY, Terryville, Conn.: A number of additional pages for insertion in their catalogue, volume 18.

COVERT MFG. COMPANY, West Troy, N. Y.: Illustrated catalogue and price-list 1903. This is devoted to a line of Snaps, Breast Chain Protector, Bull Lead and Snaps, Safety Gate Hoops, Carriage and Automobile Jacks, Chains, Ties, Halters, Trouser Stretchers, &c.

BUFFALO SPECIALTY MFG. COMPANY, Buffalo, N. Y.: Circular devoted to Liquid Veneer. This is for use on furniture, lacquered, japanned and enameled iron work, to make it appear like new.

AMERICAN MOP COMPANY, Evansville, Ind.: Price-list of Rust Proof Metal Bound Mops.

CITY FORGE & IRON WORKS, Dayton, Ohio: Circulars illustrating Lawn and Park Settees, Paint Display Racks, Tree Boxes, Box Trucks, &c.

JOS. STELWAGON COMPANY, Philadelphia, Pa.: Building and Roofing Papers. An illustrated catalogue relates to Sheathing, Deadening and Carpet Felt, Red Manila Lining, Ready Roofing, Metal Paint, &c.

THE business of the Richmond Supply Company, Richmond, Va., was begun in February, 1902, to manufacture Ricimate Fire Proof Paint and Dura Elastic Roof Paint. The former is applied to wood and all combustible material and the latter to tin, corrugated iron and also to galvanized iron. Both are referred to as having the highest qualities to resist atmospheric injury and to prevent inflammability or progress of fires where they may have started.

MILLERSBURG FIFTH WHEEL COMPANY, Millersburg, Pa., have recently undergone an entire change of ownership, C. F. Sponsler now being president, F. W. Sponsler secretary and treasurer and E. R. Thornton superintendent. The company have increased their manufacturing facilities, and have also enlarged their variety of Wrought Iron and Steel Forgings, Circles, Ovals, &c., for all uses.

MESSRS WILBUR AND SQUIRE have sold out their entire interest in the E. F. Reece Company, manufacturers of fine Screw Cutting Tools, Greenfield, Mass., and have been succeeded by F. A. Yeaw, who is the new treasurer of the company, and Mr. Malone, who is president. It is the intention of the new officers to increase the facilities of the plant, while maintaining the high quality of the goods.

L. R. SIMPSON, vice-president Wilcox Mfg. Company, Aurora, Ill., arrived in New York on the "Majestic" on Thursday, the 28th ult. Mr. Simpson has been abroad for over a year visiting the dealers in which his company are interested, and has succeeded in building up a large line of trade for the Wilcox Hangers and other specialties.

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AN EXPERIMENT IN SELLING HARDWARE.

THE following communication, designed to show how Hardware can be sold at a profit, is a chapter from the actual experience of an energetic young house in a large city, which began business in 1896 with a capital of $3000 and are now rated in Dun's as having a capital of $35,000 to $50,000; credit high. The first year's business totaled $40,000; now they are doing a business of $300,000 a year, discount all bills and carry about $30,000 worth of stock, they being especially favored in this respect, as they are surrounded by branch houses of manufacturers of all kinds of Hardware and related goods, from whose stock shortages can be quickly drawn. Their place of business has three floors, each 80 x 30 feet, the firm having been compelled to move once into larger quarters since the business was established. They retail, wholesale and export.

This synoptical outline is merely for the purpose of giving some indication of the value of their opinion from the standpoint of success. Each of the partners was for years with long established and well-known concerns. The following description of the house's method of selling goods through local agents at a distance from their headquarters is interesting and suggestive:

Advertisements and Presents.

It is pertinent to say that sometimes we find it advisable to advertise in the representative's district or to make an occasional present locally when the circumstances warrant, in which event we may bear a portion or the whole of the expense, according to the circumstances.

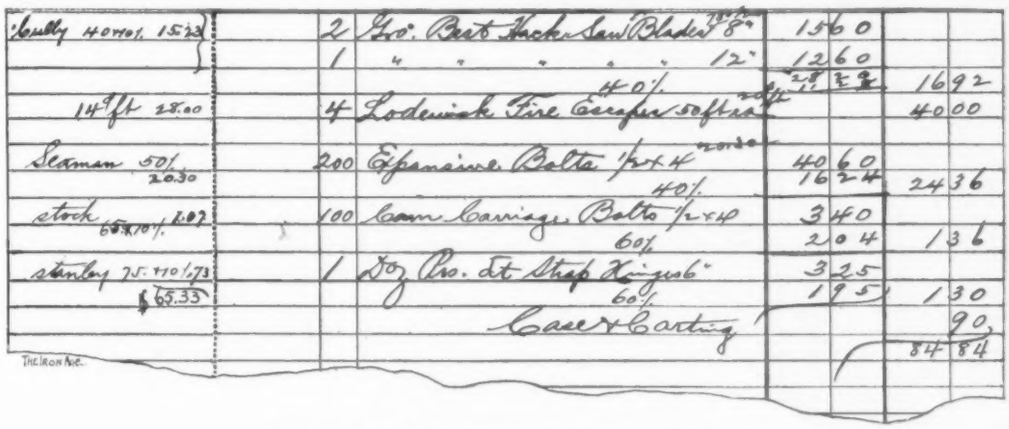
The Salesman's Incentive for Profit.

It will be seen that each representative thus has every incentive to exert himself to the utmost, not only to sell goods, but to make a reasonable margin of profit, rather than to make a superficial showing on totals without regard to gains.

The fundamental principle in this undertaking was to reward each individual according to his merits and capability for profitable business, that would be equally just to the man and firm. It is pleasing to say that we have succeeded in securing a few good traveling men on these terms.

Salesmen Given True Cost of Goods.

As the salesman was given the true cost of goods, and as his interest in the profits was identical with ours, there was no necessity for corresponding or telegraphing that prices were not low enough. (It may be said here that the organization of the business and the fact that all bills are discounted, coupled with knowledge and skill in buying, enables them to get right prices.)



Invoice and Its Stub Showing the Cost of Goods.

During the past year, in addition to our regular business of retailing, wholesaling and exporting general Hardware, House Furnishing and kindred goods, we have experimented somewhat in marketing manufactured products in comparatively distant parts of the United States, believing there were many goods we were dealing in which, if handled in the best manner, would give a joint profit to ourselves and our representative, but which handled in the ordinary way would be unremunerative.

Representatives at a Distance

With this idea as a basis, we arranged with several competent men to travel a specified territory, they to pay their own expenses and receive one-half of the net profit on the goods sold.

On our part we were to give the salesmen the benefit of exact costs, without taking into account the cost of doing business or any contingent expense whatever.

We Determine Credits.

We reserved to ourselves the determining of all credits and assumed the entire responsibility for payments, our salesman being entitled to his share of the profit as soon as an order was accepted and shipped, without regard to when the bill was paid, a regular ledger account being opened with the salesman and payments made at reasonable intervals, allowing necessary time for making up the record.

Profits Figured on Items of Each Order.

It must be distinctly understood that the profit on each item of the transaction is figured on each and every order, provision being made for this on the invoice book, which is so made that the customer gets the original bill, a carbon copy of which remains in the bound book, while in a column of the stub is shown what the goods cost, so that by footing the total of costs and deducting from the rendered total on the carbon copy the gain is shown.

Orders Priced by Salesmen.

The salesman's order is always priced on each item. A few days after the goods are shipped a reliable clerk follows up and places the costs against each article. If the goods are taken from stock this can be readily done. If purchased specifically for the order it is still easier to get the cost, because no invoice is passed for payment by either member of the firm unless each item is accounted for.

A Check on Shipping Goods Not Charged.

This, it will be seen, establishes a check on goods being shipped without charging. We have also found it advantageous to note on the creditor's bill at what price the goods were sold.

Profits Known from Day to Day.

An advantage of the system of computing the profit on each item sold, which is done in connection with

every sale, enables us to know what percentage of profit is made as we go along, without waiting months or more to find it out in the inventory or by an impaired capital when it is too late to benefit.

Shipping Goods Direct.

Where goods are so sold that they can be shipped direct from the factory the expense of doing the business is appreciably reduced, as compared with goods taken into the store, handled, packed, carted and freighted again, thus educating the salesmen to consider the transaction from the profit making point of the merchant rather than that of the average salaried salesman.

Diminished Correspondence.

It has been surprising how few letters have passed between the firm and our salesmen, as the salesmen knew all there was to it and there was no occasion for superfluous correspondence.

We may add that the office force of the above concern consists of six people, and expensive help is not required for figuring the costs of items for the marginal stub.

Letters From the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Compulsory Advertising.

We are in receipt from a manufacturing concern the following communication in which reference is made to the practice of jobbers in demanding payment for representation in their catalogues. This is a matter to which we have heretofore referred, but there is reason to believe that the practice is still continued and is found to be annoying to many manufacturers. The action taken by the American Manufacturers' Association some time ago with a view to discouraging it should, however, tend to check it if not to do away with it altogether:

The writer, who has charge of the advertising department of a manufacturing concern has often wondered if the editors of legitimate Hardware trade publications have ever given thought to the manner in which some jobbers, wholesalers and those interested in house organs, defray expenses and fill their pockets by forcing the parties from whom they buy goods to take space in their publications. I was pleased to see that one of the drug journals recently published an exhaustive editorial on this subject, aptly styled "Compulsory Advertising," and thought possibly one of the large Hardware papers might also take up the cudgels in behalf of the Hardware trade and expose this bleeding process if attention was called to the fact.

A large jobbing house has just written: "We are working on our new catalogue, which will prove a very valuable medium to any advertiser. What will you allow us for space? The amount we want for the space necessary to show your line is $——. Your competitors have allowed us this sum and we shall expect you to do the same."

If I decline to pay something for nothing (that's just what it amounts to) he threatens to throw out our line and substitute other goods. Now this I consider nothing less than "boycott" and "blackmail." Now as the manufacturer usually gives the jobber bottom prices, and makes no demands on him, I hardly think it fair for the jobber to expect a manufacturer to defray the expense of getting out a private catalogue, society programme, convention report and what not.

I propose to spend the advertising appropriation placed at my disposal to bring the best returns, and as I do not dictate to Mr. Jobber how or where he shall spend his earnings I fail to see why I should be dictated to by him.

If this matter could be placed before the manufacturers in the proper light I feel sure this evil could be lessened if not entirely stamped out.

Special Brands.

The following communication from a Hardware merchant in South Carolina is called out by letters which appeared a few weeks ago in connection with the discussion as to the position of Special Brands in the Hardware market:

It is indeed touching to note the sympathy so vividly portrayed by the jobber for the dear retailer.

Is it true as alleged that a retailer is secure in handling exclusively a jobber's special brand? Is it true that "so far as the jobber's special brand is concerned he sells direct only to the retailer?" Experience in the past and due regard for the truth lead me to challenge the statement as the writer has had heretofore unpleasant experience in that line.

In connection herewith it is but natural that the retailer's ire should be aroused to a high pitch on beholding that the special brand of Pocket Cutlery which he ordered from the jobber's representative was offered to other merchants, his competitors, as the same traveling man sought out a dry goods firm, in the same town, whom he loaded up with a stock of the same brand, and again found his way into a grocery store, where he assured the proprietor that inasmuch as Mr. ——, the Hardwareman of the town, had already successfully introduced a "special brand" of Files in the community the grocery man had better share in the profits derived from its sale.

It does seem at times that some of the jobbers' representatives do everything to alienate the trade from its proper channel, in order to be enabled to sell as many goods as possible. The practice, moreover, has the evil effect that, whereas an alien trade, as mentioned, has now succeeded in opening an account with the jobber, the orders of the grocery and dry goods men will hereafter be filled for any Hardware they may want for the accommodation of their good customers in order to save to them the Hardware retailer's profit. What with these irregularities, the venomous hydro head of the catalogue house and the manufacturer's occasional interference, the path of the retailer is strewn with many thorns over which he has to wend his weary way before he falls into the outstretched arms of the good Samaritan—the unselfish jobber who is waiting by the wayside to administer soothing cordial.

LIKE A BANK.

G. C. PENNINGTON of Waverly, Neb., issued an illustrated sheet, 12 x 18 inches in size, with the following heading:

This Sheet is Like a BANK — There's Money in it.

WE HAVE TOO MANY GOODS.

We Cannot Afford to Carry these Goods over until next Season, this is why we CUT THE PRICE.

Below the heading the sheet was divided by lines into spaces 2 x 2½ inches, and in each space was an illustration or mention of some special line of goods. These included Sewing Machines, Ranges, Cook Stoves, Cutlery, Scythes, Oil Cans, Tinware, Hoes and Rakes, Guns, Poultry Netting, Grindstones, &c. Cut prices accompanied the mention of goods in most cases. Underneath the spaces at the bottom of the circular was the following:

> Some goods offered above are far below cost. This is not considered good business policy, but we can put the money into goods coming into season and make profit enough to offset any small loss, besides keeping the wheel a-rolling during a quiet time. Yours for business, G. C. PENNINGTON.
> WAVERLY, NEB.

The circulars were mailed to customers inclosed in envelopes upon which the merchant's name, address and location was prominent in red.

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Office of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C.

The Week's Hardware Trade.

THE holidays are now over, but business on autumn account is not coming in the volume the optimists anticipated. Indeed, many level headed Hardware manufacturers are beginning to wonder whether we are not nearer a trade slump than people think. None the less, this time of the year there is always a fair demand at least for domestic articles necessitated by the coming of the cold weather. Heating and lighting appliances, Stove Grates, Kitchen Ranges, Hot Water Apparatus, Gas Fittings, Oil Lamps, Chandeliers, Electroliers, Fenders, Curbs, Fire Brasses, and Coal Vases are all in demand, but it is yet too early to compare the extent of this demand with previous years. There is a slightly increased sale of brass and composite bedsteads, but the trade as a whole continues languid owing to the scarcity of shipping orders. From South America have come this week some good indents for electroplated Spoons and Forks, but the home demand is poor.

The weakness of the copper market unsettles the branches interested in that metal. There is a feeling of insecurity as to the price of the metal during the coming autumn. Again, the American demand for pig iron is stiffening prices, and in view of increasing American, Belgian and German competition this is by no means an unmixed blessing to the manufacturers of Hardware and allied goods. The silver plating trades have recently been slightly stimulated by large orders, but on the whole the business is dull.

Pearl handles are in good request, the Germans continuing to draw their supplies of pearl scales from Sheffield, while large consignments are going regularly to America. These two markets take all the scales that certain Sheffield cutters can supply. There is no scarcity of shells, but owing to the strong demand prices are high and seem likely so to continue. There is not much weight in the Britannia metal branch, and tin is at a fancy price. On foreign account, the Australian trade is not so bad, bearing in mind the continuance of the drought, while New Zealand still buys in large quantities. India and South America are, if anything, increasing their orders, but South African indents are neither numerous nor heavy.

Willenhall Locks.

The Lock trade is one where competition more or less operates between Great Britain and America. It is well, therefore, for American manufacturers to know what is going on in Willenhall. The Locksmiths' Federation, practically a trades union, have for some time been discussing their claims to higher wages. There have been *pourparlers* between them and their employers, and the employers have been asked to "consider the advisability" of granting a further increase of 10 per cent., which would represent a total advance of 30 per cent. during the last few years. The men contend that the making of Locks is a skilled industry, and that the labor involved is inadequately rewarded. They further contend that they are worked long hours under unsanitary conditions in producing Locks and Keys of an inferior quality.

It seems to be agreed all around that wage conditions in the Willenhall district are not on a sound basis. The manufacturers themselves agree to many of the men's contentions, but they say that the making of Locks and Keys is a skilled industry only in certain branches of the trade. They agree that the Willenhall artisans can make rim or mortice Locks of good quality to differ in 50 or 100 in a suite, and with a master key to pass all. Such men are undoubtedly "skilled." If these workers are diligent in business they can command from 40 shilling to 50 shillings per week in wages. The employers say that these wages do not compare unfavorably with skilled mechanics in large engineering districts. The employers therefore retort upon their employees that there is nothing in the existing situation to call for any advance in wages, and ask the men to discriminate between skilled and unskilled working in the trade.

In making the cheaper class of Locks, largely by automatic machinery, it is contended skilled workmen are not required, as boys and girls are competent to put the component parts of a lock together. This, in fact, is the case in many of the large lock factories. The Willenhall locksmith, not coming under the category of "skilled," but who does work apart from the automatic machine, will earn between 25 shillings and 30 shillings per week. As the Willenhall manufacturers are now feeling keenly American, German and Belgian competition they are naturally averse to any change in business arrangements which may add to the net cost. This outline gives an interesting little bird's eye view of the general attitude toward high wages still obtaining in this country. The larger policy of high wages, coupled with up to date machinery does not as yet seem to have obtained any lodgment in the brains of either masters or workmen. My recollection is that the Lock makers in America obtain considerably higher wages than these, and yet American competition is the keenest to be contended with.

I am further inclined to the opinion that the British Lock makers have not any clear idea as to the cost of each process of their industry. Habit and tradition are the predominant influences at work, and this I believe is the real reason why they find it so difficult to compete with new factories where modern machinery, modern ideas and mental alertness are brought to bear. Yet it is being drummed into their ears almost week by week that much of the success achieved by Americans has been achieved because Americans have learned the economics of high wages. The Birmingham and Willenhall industries in general all suffer from the defects of the British qualities of mental isolation and commercial reticence. Instead of the men across the road coming over and frankly discussing difficulties common to each when pressure comes, the first thing thought of is to reduce wages. But the curious thing to my mind is that the English Locks of high quality are selling relatively much better than the cheap rubbish. Week by week I have reported in these columns considerable activity in good quality Locks and considerable stagnation in the cheaper makes. How far this relates to the wages problem I cannot say, but I feel that there is some subtle connection between the two.

Postal Facilities Between England and America.

The advent of a new Postmaster-General always raises the question "Will the new broom sweep clean?" If so, it is to be hoped that something will be done promptly in the direction of an Anglo-American parcels post. I am bound to say that the Americans seem more to blame on this head than the British Post Office. No doubt the efficiency and influence of private American carrying companies, such as the American Express Company, renders it difficult for the Washington authorities to antagonize such influential business organizations. At the same time, in England we send small parcels through the post office and are satisfied that it can be done with advantage. Speaking some time ago with a rural postmaster, he told me that it is extraordinary what an increase in the trade in small parcels can be done if facilities are only granted. He said that in his district he had organized a prompt collection and delivery for small parcels, with the result that in a year or two's time that department had quadrupled itself. It seems to me therefore necessary for the Washington Post Office to come to terms with the British Post Office, so that we may at length have an Anglo-American parcels post. It should be as easy to send a small parcel from London to San Francisco as in the reverse case. If this were possible a very distinct commercial gain must result.

The Future of the Ivory Trade.

As Ivory enters so largely into the manufacture of Cutlery, and as, further, it is to a large extent being

supplanted to-day by Celluloid and other substances, it may be interesting to American Cutlery manufacturers to have the gist of a recent article published in this country upon the subject of the Ivory trade. It is asserted that the great demand for Ivory among the agents of the different firms that maintain stations in tropical Africa is reducing the profits on that article of commerce to a great extent, and the hope is expressed that merchants will themselves take steps to restrict a traffic which is rapidly bringing about the extinction of the African elephant. According to this article, in which a well-known French writer has just brought together some information on the subject, as much as 11 francs 50 centimes, and even 12 francs, the kilogramme has been paid for Ivory in the French Congo. This comparatively high price can scarcely be said to be due to any great scarcity of supply. The writer declares, indeed, that the European market is overstocked. The quarterly sales at Antwerp average 70 tons, and it is estimated that at the present time the stock in hand at that port amounts to as much as 130 tons. As a natural result the price obtained for the tusks on the European market has fallen considerably.

A few years ago 24 francs the kilogramme could be obtained, but since then, it is declared, the ruling price has at times touched so low a figure as 16 francs. Obviously at this rate the profits must nearly be at the vanishing point if 12 francs the kilogramme is paid for Ivory in Africa. No doubt these are extreme figures. The average price obtained for the tusks at Antwerp seems, indeed, to be 20 francs the kilogramme. It is estimated that the average weight of Ivory obtained from each elephant killed at the present day is not more than 20 kilogrammes. At 20 francs the kilogramme this would bring in about $80, a ridiculously small value for such an animal as the elephant. Tamed and domesticated, many authorities are convinced that the African elephant would be of the greatest service in the development of the continent, and the price of its tusks would only be a small proportion of its value. I suppose every user would prefer an Ivory to a Celluloid handle, but unless the Ivory trade is in the near future regularized and a perfectly secure delivery obtained, Celluloid will go on winning to the detriment of Ivory and to the disappointment of many of us who like to have our Cutlery in Ivory hafts.

Steel Forks

What constitutes a steel Fork? Sheffield manufacturers are just now tumultuously discussing the subject. This week in the Sheffield Police Court a manufacturer trading as the Sheffield Scissors & Fork Company was summoned for selling Forks to which a false trade description was applied. The Fork in question was described as made of steel, and the question to be decided by the Magistrate was whether or not enough steel entered into the composition of the Fork to warrant the manufacturer in giving it such a designation. The case had been tried before and dismissed on a technicality, and now came up again. It is admitted that the Forks were made of a mixture of what was described as boiler plate punchings. Professor Arnold, the well-known Sheffield metallurgist, said that there could not be more than 20 per cent. of this boiler plate in the mixture; the manufacturer, however, contending that there was 25 per cent. The rest was made up of what is indefinitely described as pig iron.

One witness who examined the Forks said that they would not stand the test of being hammered hot and cold. His conclusion was that the material was malleable iron and not steel. The actual analysis showed combined carbon 0.4; graphitic carbon, a large portion, certainly over 2 per cent.; silicon, 1.75 per cent.; sulphur, 0.24. It was contended, therefore, that an analysis giving such results negatived the idea of the Forks being made of steel. Strictly speaking, of course, any material containing so much carbon and silicon could hardly be described as steel. Professor Arnold, asked, "Is there a standard of steel in England to-day?" answered: "You cannot get a definition which would cover every possible corner." Another witness produced the laws and ordinances of the Cutlers Company passed in 1780, which stated that a fine of 10 shillings per Fork should be imposed on Forks made of cast iron, either alone or intermixed with wrought or forged iron or steel, the money to be distributed for the benefit of the poor.

The defendant, in giving his evidence, said they used a good brand of pig iron with 25 per cent. of steel boiler punchings and scrap, which was the waste from the previous casting. He had hardened and tempered material similar to that used for the Forks in question. A number of workmen were called in succession, each testifying that they had both hardened and tempered the material used. The Magistrate seems to have been picking up some hints on his own account, for he stated that the test he proposed to apply was as follows: When heated red hot and then suddenly cooled, steel became hardened to a greater or less extent and was rendered more or less brittle and elastic; and then when the steel was heated red hot and cooled slowly, it, on the other hand, lost its hardness and became soft and malleable again. That was the test by tempering fully. In this case the tempering of the material had only gone half way. He thought he ought to be guided by that, and if it was tested to see what the behavior was under the double test. No one had been before him who had put Forks to the test of heating them and slowly cooling them and seeing what the behavior of the material was then. It looked improbable that it should be steel with so much cast iron in it. But in these days of manufactures he could not say. In the end it was decided that further tests should be made, and we shall doubtless hear more of the case. I mention the matter because it may be later on some American manufacturer will be trying his luck in this country with Steel Forks. If so, it will be necessary for him to beware of any false description, as that brings him within the meshes of the law.

The Birmingham Gun Trade.

In the latter half of the eighteenth century Matthew Boulton, the well-known Birmingham manufacturer, writing to the British Government concerning a scheme for obtaining a monopoly from the French Government, wrote as follows: "There are at present no iron founders in France capable of executing such large pieces, and while they can receive them from England such establishments may be prevented or retarded, but it may not be unworthy the attention of the Government to consider that such establishment of foundries for very large pieces of cast iron would very much facilitate the establishment of a foundry for the manufacture of Iron Guns (*i. e.*, Cannon) like those made in England, which the French Government we know are very solicitous to effect." History, and particularly commercial history, records some clear cases of topsy-turvydom, and not the least interesting is the case in point, for we have now learned that France can make heavy Guns with enviable perfection, while smaller Firearms are being made in Belgium to the detriment of British manufacturers.

A short time ago I reported that a deputation was going from Birmingham to Liege to study Belgian methods. A prominent member of the Birmingham Gun trade is pessimistic as to the future of Birmingham in this regard. He recalls that not very long ago he and his fellow manufacturers did an immense trade in sporting Guns with the United States. Now only one or two makers with a recognized "name" send Guns across the Atlantic to fastidious sportsmen, who of course pay the price. But the Dingley tariff and Belgian competition have completely killed the trade in medium class and cheap guns. When the tariff bill was passed, Gunmakers in the States could not turn out a Gun for less than about £4, whereas a corresponding weapen could be made in the district of Birmingham for about £2, and in consequence a good trade was done with America.

The Dingley tariff imposed a specific duty of about $6, and an ad valorem duty of about 35 per cent., and the door was closed with a bang. Since then the Belgians have stepped in and captured the cheap trade. They can turn out a Gun, warranted not to burst the first time it is used, at prices quite impossible to English makers. For instance, they catalogue Breachloading Shotguns at prices ranging from $2 to $5, while

Flobert Rifles are actually priced at $1.25 upward. Not only are these Guns made at the price, but they have a very presentable appearance. American Gun makers may perhaps take warning from the experience of this gentleman. He says that the Belgians are adepts in the art of imitation, and some of these cheap Guns are made to resemble better ones so closely that even an expert might be deceived at first sight.

Take, for example, the Damascus barrel, with the delicate tracery on its surface. In the real article the design is produced by careful manipulation of the metal from which the barrel is made. The Belgian has discovered how to figure the surface of the barrel without the preliminary work. With him it is a scientific after process, the result of a superior technical, or rather scientific, education, while his British competitor is still in the dark, unable to discover the secret. Similar success is attained in the imitation of the twisted barrel, a variety only a little less pretty than the Damascus. Assuming that the British manufacturer knew how to "fake," he would be able to use plain material that would cost him about $45 a ton, but as it is he has to pay about $150 a ton for the specially mixed metal used in the manufacture of the Damascus barrel, and about $100 a ton for that used in the manufacture of the twisted barrel, and then on top of this prime cost comes the heavy expense of manipulation. What this means is shown by the fact that, although the prime cost of the metal shows a difference of only $50 a ton, a pair of Damascus barrels would cost just about as much again as a pair of twisted barrels. Years ago the Belgian barrel was a very soft, inferior article, but has since been greatly improved, even though the British made barrel is still the better article of the two.

Now comes the commercial result. It is not possible to state accurately the extent of the trade in barrels done by Belgium with this country, but under the heading, "Arms and Ammunition," Great Britain bought from Belgium last year $360,000 worth. Practically the bulk of this would be Belgian barrels. This was a distinct falling off compared with the year 1900, but is well in advance of the year 1899. Belgian catalogues are being sent to this country, and Belgian travelers are going round the provincial towns offering Double Barrel Guns of the top lever type from about $5 upward, while a corresponding British made Gun could not be bought for less than from $7 to $7.50.

Instead of facing the manufacturing difficulties thus created, Birmingham manufacturers have actually been facilitating the task of their Belgian competitors by purchasing these cheap foreign Guns and introducing them to their customers, the Hardwaremen and gunsmiths up and down the country. On occasion they have even put their names on the Guns, and in consequence there have been prosecutions by the Proof House authorities. Of course the game has been discovered and retailers have gone direct to Belgium. Take again the trade in cheap Pistols. Some 25 or 30 years ago Birmingham did a large trade in this line. There was, for instance, the old saddle Pistol; now the handy Revolver has displaced the old muzzle loader, but the Belgians have captured a large share of the cheap Pistol trade that formerly came to Birmingham. The only way out of the difficulty obviously is greatly improved technical instruction.

WATERBURY BRASS COMPANY'S NEW CATALOGUE.

WATERBURY BRASS COMPANY, 122-130 Centre street, New York, have just issued an illustrated catalogue showing in classified form the great variety of Brass, Bronze, German Silver, White Metal and Copper Goods carried in the New York warehouse, aggregating upward of 1,000,000 pounds. The book contains 52 pages in all, one-half of which at the back consists of tables of weights, measurements and rules of service to buyers ordering goods. Anouncement is made of the company having taken over the right to manufacture Pope's Island White Metal, which is referred to as especially suitable for drawing, spinning and forming purposes, a marked feature of the metal being the high finish obtainable and its noncorrosive qualities.

DEATH OF STEPHEN ROSE.

STEPHEN ROSE, treasurer of the Barker, Rose & Clinton Company, wholesale Hardware, Elmira, N. Y., died of pneumonia, August 23, after a three weeks' illness. He was born in Port Jervis July 7, 1837. His boyhood was spent in Milford, Pa., and later in Rockford, Ill. On his removal to Elmira, he first found employment as a Hardware clerk and later as a bank clerk. In 1865 he embarked in the Hardware business as one of the partners in the firm of Ayrault & Rose. In 1872 the firm became Booth, Dounce, Rose & Co., and were composed of I. D. Booth, W. J. Dounce, O. H. Dounce, Stephen Rose and Frederick Barker. This firm continued in business from 1872 to 1874. From 1874 to 1888 the firm were known as Barker, Dounce, Rose & Co., being composed of Frederick Barker, Stephen Rose, W. J. Dounce, O. H. Dounce and Stephen S. Gray. In 1888 the firm again changed, becoming Barker, Rose & Gray, being composed of Frederick Barker, Stephen Rose and Stephen C. Gray. The firm continued under this name until 1897, when the present Barker, Rose & Clinton Company, Incorporated, were formed, the memebrs being Frederick Barker, Stephen Rose, Arthur Clinton and S. Edward Rose. Under the financial direction of Stephen Rose they have participated in the properity and reputation that come to all business enterprises which have such men at their head.

For many years this house have conducted business at the corner of Lake and East Water streets. In June, 1890, the store took fire and in one of the most disastrous conflagrations Elmira has known the block was burned. For a year the firm had their headquarters elsewhere in the city until the present fine building was erected on the old location.

As a business man, Mr. Rose had always been held in the highest esteem for Christian integrity, conscientious honor and generous liberality. For many years he was an honored elder in the Presbyterian Church, and has been a very successful Sunday school superintendent. No finer tribute to his memory, character and disposition could be paid than that made by one of his business associates, who, when speaking of Mr. Rose, said: "No finer, truer man than Stephen Rose ever lived, to my knowledge. I do not believe that a wrong thought ever entered his head. For 30 years and six months that we have been engaged in business together we have never had so much as the slightest friction. We have had different opinions on various matters, as all men will, but if the slightest impatient word was ever spoken, it was on my part."

To Cement Porcelain Letters to Glass.—Slake 15 parts of lime in 20 parts of water. Melt 50 parts of caoutchouc and 50 parts of boiled linseed oil together and bring the mixture to a boil. While boiling, pour the liquid on the slaked lime, little by little, under constant stirring. Pass the mixture, while still hot, through muslin, to remove any possible lumps, and let cool. It takes this cement two days to set completely, but when dry, it makes a joint that will resist a great deal of pulling, whether from expansion or contraction.—*The Show Window.*

A meeting of the Executive Committee of the Iowa Implement and Vehicle Dealers' Association was held at Des Moines, Iowa, August 27, at which the following members were present: O. V. Eckert, president; J. J. Gaston and W. P. Jones, directors, and D. M. Grove, secretary. The purpose of the meeting was to arrange a programme for the convention of the association to be held December 2 to 4. The committee decided to hold but two business sessions, on the mornings of December 3 and 4. The night of December 2 will be given over to welcome addresses, responses, &c., and on the night of December 3 entertainment of some nature will be provided by the local committee.

THE SALESMAN.

BY WESTERN RESERVE.

MANY a good man is working at a desk to-day in some official capacity, hugging faithfully a thousand dollar salary and growing dyspeptic, who is worth twice this amount as a salesman. If he chooses he can begin his career as a salesman the very first day he enters the store. No matter what work he is given to do, and even though it may be several years before he expects to really sell the goods which surround him on all sides, let him keep his mind and attention as much as possible on the goods which he packs and unpacks or places on the shelves in connection with his daily duties. In this way he gradually becomes familiar with the different styles, sizes, &c., their relation to each other and their selling qualities. Evenings at home he can pursue his aims further by reading old catalogues relating to the goods. These old catalogues are being thrown away daily at all stores and are easily obtained.

Missing Opportunities.

The tendency of the average worker about the store room is to handle an article of merchandise as just so much "stuff," regardless of its style, quality or worth. Little does he think of the daily opportunity of studying and learning all about the goods, he moves from box to shelf and back again. It is just this neglect of opportunity, if continued, that keeps this man for all time in the receiving and shipping department. One who cultivates the study and thought of the goods as he goes along with his work finds the daily task growing lighter and more interesting. The hours so tedious to the plodder go quickly by if concentration and thought is cultivated. The attention one directs toward his work attracts the attention in return from his employer, insuring early advancement with increase of opportunity and salary. If one must begin in overalls, sweeping and dusting the stock, why not study it while dusting it, and the future will take care of itself.

The Greatest Aid in Making a Good Salesman

is knowing the "whys and wherefores" of the article sold. The fellow who expects to make a success of selling shoes should know everything about the history of shoes and the different stages of improvement that the shoe has gone through, what the leather is and how it is tanned and perfected. Teach a man thoroughly how to talk and sell shoes and he will be able to learn quickly, if necessary, how to sell biscuits or soap, because he will appreciate from his success in selling shoes the importance of knowing all about any article in order to sell it well.

The prospective buyer is more easily impressed with one's sincerity or advice, if the man selling is thoroughly posted in what he aims to sell. The same buyer is more quickly affected in the opposite direction if he finds that the one selling is trying to dispose of something of which he knows but little.

Illustrations of Good Salesmanship

In order to sell Plows it may not be necessary for a man to know just what the proper mixture in the furnace should be to turn out the best Plow point. That's where the expert comes in, but he should know enough of the process to talk intelligently about it in a general way. There is a Plow made in one of the Middle States that has had a very large sale. The proprietor himself states that there are two other makes of Plows that always beat him in a test at work at fair grounds and public displays, and yet he says he sells more Plows—ten to one—than they do. This only goes to show that the men making the better grade of Plows are giving too little attention to the selling of their product. They lack in salesmanship, and this is true in many cases, especially in the manufacturing industries where the proprietor is a practical mechanic, one of the kind who has grown up in his own business.

There is a large Stove manufacturer in the Central West who makes one of the best kind of Stoves. It is a special design of Cooking Range that he has made for some 20 years. While he has made some money it has been at a great sacrifice of time and experience. If the Stove he made had been of the common every day sort he could hardly have succeeded, but as it was something special and not generally made by Stove manufacturers he succeeded fairly well. He is an example of the practical mechanic referred to above, one of the kind who thinks that goods well made will sell themselves. In consequence, he never has pushed his sales, as he should have pushed them, in order to make a complete success.

A little farther West we find a couple of men who are not what we call practical fellows in the manufacturing business, starting in to make the same style of a Stove that the practical man has been making for years in his complete foundry. The Western men have no foundry at all, but know the value of good salesmen. They have their castings made here and there and merely assemble the Stove together at a central point. In the short space of five years they make $500,000. The Stove they make is not only inferior to the one made by our practical friend, but is sold for more money. Now why is it that the older concern, with better facilities, better goods and lower prices, should be making but $1 when the other people make $10? Simply a lack of good salesmanship. It is a fact that the Western man hired one of the brightest chaps they could find, who, in turn, gave his time entirely to drilling salesmen and placing the advertising. Herein was the mainspring of success and a great success at that. The same system and energy directed toward selling flour or Plows as was given to selling this Stove will win out every time. The man or men who know how to sell goods are the men needed in the business world to-day. No trouble to hire plenty of good bookkeepers and stenographers, but the good salesman is never out of a position.

The Requirements.

Here are a few requirements for a good salesman:

Honesty and frankness.

Neatness in dress.

Good appearance physically.

Correct and distinct speech.

Control of temper and avoidance of argument.

Optimistic ways of taking people and things.

Saying little about yourself, your politics or your religion.

Keeping posted on the topics of the day and especially of those relating to your own trade.

Aiming to obtain information that will assist your customer to advertise and sell the goods he buys of you, in order to keep your goods moving from his shelves.

Patience, Perseverance and a Pleasant Smile. "The man worth while is the man with a smile."

Always looking on the bright side of things and bearing in mind that the man who buys of you looks on all sides, so that it is desirable to sell him good goods if you hope for a second order.

Most any well meaning boy or man can come up to these simple requirements if he aims to do so. They can all be acquired easily. Too much importance cannot be attributed to one's physical make up. No man, of course, can hope for permanent success who abuses himself in excesses of any kind, and his measure of success, even if he has no bad habits, can be made much greater if he aims to be physically perfect. The bright eye, the elastic step, the fresh complexion and earnest enthusiasm are the great drawing cards in whatever is to be done. It is never too late to mend, and with the older head mature judgment is of great assistance, provided age has not warped one's ways. Chasing after the trade of to-day, in business, is a somewhat fickle race. One must be willing to change tune or reverse quickly to keep in step with the newer ideas of the day—ever changing.

Business colleges in the larger cities, especially, it would seem could easily add this branch to their work, giving it in charge of a man who is fitted to start the student in the proper way; but, regardless of teachings at schools or colleges, the young man who can appreciate and take home to himself the arguments touched herewith, and who desires to succeed as a salesman, can begin at once in whatever station he may be to

follow along the lines here laid out and outstrip many would be chaps who rely merely on their wit and opportunity to assist their employer in disposing of his wares. All due credit to the active, reputable salesman, for in the war of trades he is the man behind the gun. It is his magic "touch and go" that discharges the products and makes room for another charge of merchandise from the hands of those in the store and factory.

MISCELLANEOUS NOTE.

The Fox Shaving Sets.

The Fox Cutlery Company, Dubuque, Iowa, are offering a line of shaving sets. These consist of razors, comb, lather brush, strop, &c., in attractive cases. The company refer to the goods contained in the sets as all being of high quality, the Fox razors, fully guaranteed, being the most essential part of the sets. Particular attention is called to set No. 30, although No. 300 is nearly as popular among their trade.

New Central Mantel Design.

The accompanying cut represents a new design of mantel brought out by the Central Mantel Company, 904 Pine street, St. Louis, Mo. Among the special features

New Central Mantel Design.

pointed out by the makers are the carved claw feet, shape of the mirror, swell frieze and the hand carved festoons of flowers, which are referred to as standing out in bold relief, the tile facing showing through the festoons. Oak mantels are carried in stock but they can be made up in any wood when so ordered. The company's goods are distributed, to a considerable extent, through the hardware trade.

The Marvel Can Opener.

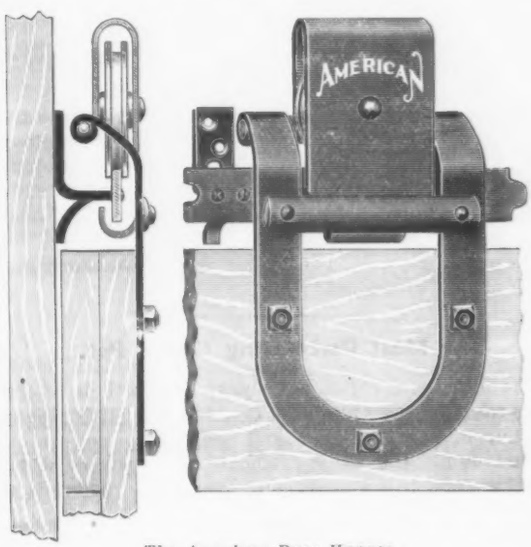
The Kalischer Mfg. Company, Cleveland, Ohio, have put on the market the can opener shown in the accompanying cut. It is made of cold rolled steel, the blades sharpened and tempered and will, it is stated, never get dull. Among other points of excellence the following are mentioned: That the opener protects the fingers and hands from the tin, that it does not slip out of the can when it is in operation, that as there are no

The Marvel Can Opener.

corners to harbor dirt it is sanitary, and that it is simple, strong and durable. The opener is designed to retail for 10 cents each.

The American Door Hanger.

The Griffin Mfg. Company, Erie, Pa., are putting on the market the door hanger and track shown in the accompanying cuts. The hanger has the elastic swinging feature and at the same time is constructed as shown that it may retain all the rigidity of the one piece hanger. The track has, it will be seen, double braced brackets to prevent it from springing or sagging. The manufac-



The American Door Hanger.

turers call attention to the fact that the wheel is full roller bearing and accurately turned so that it is anti-friction on any length of track.

The Dandy Electric Carpet and Clothes Whip.

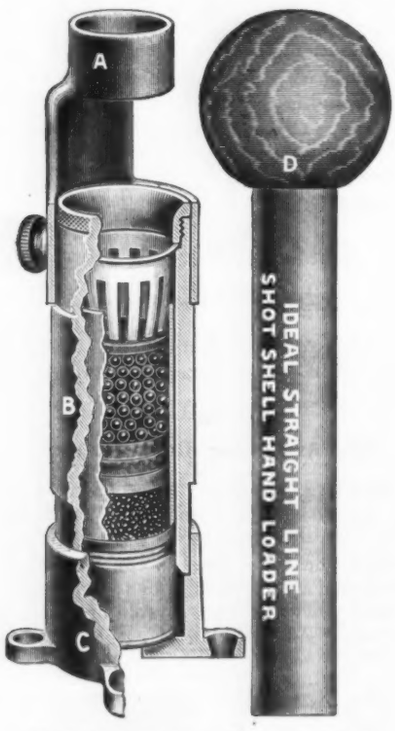
The carpet and clothes whip illustrated herewith is made of rattan reeds ½ inch in diameter, rendering it

The Dandy Electric Carpet and Clothes Whip.

light and durable. It is put on the market by the Theo. J. Ely Mfg. Company, Girard, Pa.

The Ideal Straight Line Hand Loader.

The accompanying cuts represent a straight line hand loader for loading and reloading paper shells for shotguns put on the market by the Ideal Mfg. Company, New Haven, Conn. The loader will be made for 10, 12 and 16 gauge only. Parts A, B and D are different for each gauge, while part C is the same for all gauges. It is explained that those having an Ideal loading machine and

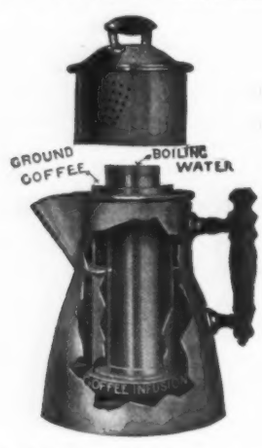


The Ideal Straight Line Hand Loader.

desiring a light portable hand machine to take on a trip may purchase parts A, C and D only, and use the loading chamber that is with the machine, as part B of the loader illustrated is the same as chamber No. 2 in the Ideal loading machine. It is pointed out that chamber No. 2 has been further improved by having a screw top as shown in the cut. The loader may be fastened to a bench or not, as desired.

The Ideal Percolating Coffee Pot.

The aluminum coffee pot shown herewith is offered to the trade by the Aluminum Cooking Utensil Company, Pittsburgh, Pa. The spout and body of the pot are one continuous piece of metal, without joint, seam or solder, and therefore, it is stated, can never leak. There is no

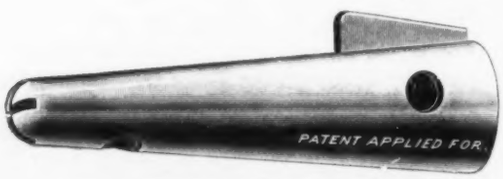


The Ideal Percolating Coffee Pot.

strainer across the spout; the flange of the cover fits snugly into the body of the pot, obviating the necessity of a hinge, and by the position of its perforated portion provides a strainer or renders the pot steam tight as desired. The cover handle is made of hard wood, so as not to get hot, and furnishes a secure hold for removing the cover or for rotating it while in position. Each end of the handle is securely attached to the cover. The tubes, or cylinders, forming the percolator are made of finely perforated sheet aluminum, and are suspended in the pot. The bottom of the outer tube is closed without perforations, while that of the inner tube is open. The finely ground coffee is placed in the space between the tubes, and boiling water is poured into the inner tube, which projects above the pot for this purpose. Among the advantages claimed for the pot are the following: That aluminum, of which it is made, is not in the least affected by tannic acid or by any of the many ingredients found in coffee; that aluminum retains heat longer than any other known metal, hence the coffee remains hot longer than in pots made of any other material; that it is simple in construction and perfect in manipulation, and that the initial cost is far below other percolating coffee pots.

The Grimm Sap Spout.

G. H. Grimm & Co., Rutland, Vt., have placed on the market the sap spout shown in the accompanying illustration. It is made from one piece of No. 21 gauge



The Grimm Sap Spout.

steel. The tinning is the last operation so that the raw edges are covered with pure block tin, besides being a guarantee against rust. The holes opposite each other at the large end are for inserting a nail to form a handle, by means of which the spout is slightly turned and thus is readily removed from the tree. The hole at the bottom of the small end is for draining the sap from the bore so as to prevent the formation of ice and the accumulation of sour sap in the bore. The spout will fit ⅜-inch, 7-16-inch and a ½-inch hole. By reaming a ⅜ bore to 7-16 inch, and a 7-16 bore to ½ inch at proper intervals during the sugar season one fourth more sap, it is claimed, will be obtained; also that with the use of this spout removing of the bark from the tree is not required. The spouts are furnished with and without hooks.

Ely's Dandy Mop Stick No. 11.

The Theo. J. Ely Mfg. Company, Girard, Pa., are putting on the market the mop stick shown herewith. The

Ely's Dandy Mop Stick No. 11.

opening is referred to as larger than usual, while the handle is not weakened by turning down or boring. The lever and ring are of malleable iron and the capacity of the spring is alluded to as large. The aim of the manufacturers has been to overcome all objectionable features in the construction of the stick.